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The Performance of Responsible Equity Funds During Market Crises

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ABSTRACT:

The purpose of this thesis is to study the performance of responsible equity funds during periods market crises. Previous literature has found evidence of outperformance by stocks of responsible companies and responsible mutual funds during market crises. Additionally, this thesis provides evidence of the performance of responsible equity funds and compares risk-adjusted returns of responsible investing to those of conventional equity mutual funds during a sample period of almost two decades.

This study employs a dataset of 110 US-based socially responsible funds and 120 US-based conventional equity funds from January 2000 to October 2019. These mutual fund groups are used to construct two time-series of the returns of an equal-weighted portfolio of the SRI funds and conventional funds, respectively. The abnormal returns of SRI and non-SRI are measured using the capital asset pricing model, the Fama-French three-factor model and the Carhart four-factor model. In order to measure the performance of these portfolios during crisis periods, these asset pricing models are extended to include crisis and non-crisis period alphas.

The results suggest that both responsible funds and conventional funds do not generate abnormal returns during the whole sample period. In addition, SRI significantly underperforms non-SRI during crises and their non-crisis period performance are similar. However, during January 2010 – October 2019 the SRI portfolio outperforms the conventional portfolio during crises and normal market conditions, although, the difference between the two is not significant.

Responsible investing does not provide investors with downside protection during periods of market turbulence. On the contrary, SRI underperforms during market crises which contradicts previous research. Additionally, the performance of SRI does not significantly differ from that of non-SRI during normal market conditions. These results suggest that investors should not expect abnormal returns while investing responsibly. However, investors should not favor non-SRI neither, since the risk-adjusted returns of SRI do not significantly differ from those of conventional mutual funds.

KEYWORDS: Responsible investing, Mutual funds, Market crises, ESG, CSR

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Abbreviations

AUM – Assets under management
CAPM – Capital asset pricing model
CER – Corporate environmental responsibility
CFP – Corporate financial performance
CSP – Corporate social performance

CSR – Corporate social responsibility
DCF – Discounted cash-flow
EMH – Efficient market hypothesis
ESG – Environmental, social & governance
SRI – Socially responsible investing
UN PRI – United Nations Principles for Responsible Investment
ROA – Return on assets
ROE – Return on equity

1 Introduction

Responsible investors take matters of environmental, social and governance (ESG) into consideration when making investment decisions – whether choosing between individual stocks or when selecting mutual funds. As the society is increasingly concerned about climate change and corporate social responsibility (CSR), responsible investing offers investors a framework to mitigate the effects of, for example, lacking governance standards or the transition risk of climate change on their portfolios and generate returns, that are at least similar to those of non-SRI.

Socially responsible investing (SRI) has become mainstream in the recent years while there is much heterogeneity surrounding the definitions and terminology of SRI. There has been research on SRI since the early 1970s but there is not a consensus on the performance of SRI. Opponents of SRI claim that due to a restricted investment set, socially responsible funds lack the diversification of conventional funds. This should lead to underperformance by SRI funds. Proponents of responsible investing argue that corporate social responsibility leads to better financial performance and thus to increased investment performance. Others (incl. Nofsinger & Varma, 2014) claim that responsible investments have insurance-like properties in that they perform better during market crises. However, due to definitional heterogeneity, research on SRI is difficult and many studies employ different methods to estimate investment returns. Small data sets and differing time frames are also a problem when comparing the results of these studies.

Recent surge of supply of socially responsible investment products has increased the importance of research on SRI. Investment managers have their own definitions of SRI while claiming that these products have offered abnormal returns in the past. However, there is not a consensus on the outperformance of these products compared to conventional ones. The purpose of this research is to study the performance of socially responsible mutual funds during different phases of a market cycle – crisis and post-crisis periods. Lins et al. (2017) find that investing in responsible companies during market crises

generates significant abnormal returns. Moreover, Nofsinger and Varma (2014) find that SRI mutual funds outperform their conventional peers during periods of bear markets.

This thesis contributes to the existing literature by measuring the performance of SRI equity mutual funds during the two most recent bear markets in the US – the Dot-Com bubble of 2000 – 2002 and the financial crisis of 2008 – 2009, as well as during the seven market corrections of the 2000s. Do these mutual funds offer protection to their investors or are investors better off investing in conventional mutual funds during extreme market conditions and do investors pay for the potential risk-mitigative property of SRI during normal market conditions?

The research hypotheses of this thesis are the following. First, responsible investing overperforms non-SRI during market crises, and thus exhibits an insurance-like property. Second, SRI is hypothesized to underperform during non-crisis periods, during which investors pay the premium for overperformance during crises. Third, the overall performance of responsible funds and their conventional peers do not differ significantly.

The structure of this study is the following: the second chapter includes a literature review which defines the concepts related to the subject of this thesis and presents the literature on the development and performance of responsible investing. The third chapter presents the theoretical background of corporate social responsibility and responsible investing from the corporate perspective as well as from the perspective of an investor. The fourth chapter presents the data and the research methodology and chapters five and six are dedicated to the results and the conclusions of this thesis, respectively.

2 Literature review

This section defines the concepts related to socially responsible investment as well as reviews previous literature on the development and performance of responsible portfolios and responsible mutual funds as well as the screening techniques employed by socially responsible investors. The previous literature has tried to answer whether investors in SRI have been able to achieve their simultaneous goal of wealth-maximization and social responsibility. The field is subjected to heterogeneity on many different levels, as no consensus has been formed on the definition, terminology or even the performance of SRI.

2.1 What is socially responsible investing?

Socially responsible investment funds have seen an increasing interest in them in the last few years. In 2018 the assets under management by socially responsible investors is estimated at over USD 20 trillion (Forbes, 2018). Although responsible investing has been studied for over four decades, definitions and terminology of SRI have not been settled on. According to Sparkes and Cowton (2004) the most common terms in the field are socially responsible investing and ethical investing. Of these two, they argue that ethical investing is the older one, but it has increasingly been replaced by socially responsible investment. Sandberg et al. (2009) argue that the term ethical investing originates from the exclusion of certain companies on moral grounds by churches and that the term is was created in the UK. Over time, the US term socially responsible investing has come to replace ethical investment. According to Climent and Soriano (2011) SRI uses environmental, social and governance factors into investment process – including analysis, selection and choice of investment. The UN Principles for Responsible Investment (UN PRI) defines ESG integration as “the systematic and explicit inclusion of material ESG factors into investment analysis and investment decisions.” However, since the integration of ESG considerations to investment activities has remained inconsistent and difficult to

measure and compare, asset owners are facing difficulties in identifying ESG practices that truly add financial value. (Sloggett, 2016.)

Sandberg et al. (2009) reviewed the website sections dedicated to SRI, online quarterly reports, investment policy documents and annual reports of 101 institutional investors which had signed the UN Principles for Responsible Investment. They state that socially responsible investing is the most common term used to express investments which integrate ESG factors in the investment process. The second most popular term is “ethical investing” whereas other existing terms are “social”, “responsible”, “natural” and “values-based investing”. Cultural differences between regions and market conditions hinder standardization – fund companies have incentives to develop their own definitions of SRI. Sandberg et al. (2009) argue that homogenization could be made possible by a top-down standardization movement. However, practitioners do not view the heterogeneity of SRI as a problem in the way that academics do.

Fabio and Jondeau (2019) argue that the use of ESG factors is caused by the increase in the availability of data. Sandberg et al. (2009) state that there is not a consensus on how these factors should be integrated nor on the definitions of this kind of investing. All in all, there are four levels heterogeneity in SRI: terminological, definitional, strategic and practical. There is some agreement on the definitional level as most SRI proponents agree on the definitions of the terms ethical and socially responsible investing. However, the debate is centered on how much weight is given to financial concerns compared to non-financial ones. (Sandberg et al., 2009.)

2.2 Development of SRI

According to Sloggett (2016) the first steps toward socially responsible investing were taken by faith-based organizations in the 1970s as they believed that their investing activities should reflect their values and that their investments could change the way companies practiced business. During the 1970s SRI was mostly viewed as a fringe activity.

Due to response to the demands of asset owners, the weight of SRI and ESG strategies has grown dramatically. (Sloggett, 2016.)

Moskowitz (1972) was one of the first to consider whether social issues should be considered in investment decisions. He stated that socially responsible investments do not have to be financially weak. He argued that the social awareness of SR companies will enable them to surpass their competitors. According to the author, some of the earliest adaptors of socially responsible investing were the two largest philanthropic institutions of the US – the Ford Foundation and the Rockefeller Foundation. These foundations studied their investment portfolios and looked for investments which violated the social-improvement guidelines. In addition, Yale and Cornell analyzed their investment portfolios through a social lens. At that time the first SRI funds were organized. These funds had mandates to favor companies which were socially responsible. For example, the Vantage Ten Ninety Fund was under obligation to invest at least 10 percent of its portfolio to firms which were involved in pollution control and combating the problems in inner cities and the war on hunger. (Moskowitz, 1972.)

Church investment organizations were the first to use ethical investing but in the early 2000s more and more SRI funds have been offered to the public. The first SRI funds were formed in 1971 in the US and 1984 in the UK (Sparkes & Cowton, 2004.) The original model was to avoid companies which were deemed unethical and exclusionary screens are still the predominant methodology used by the SRI industry (Schepers & Sethi, 2003). A small number of funds have started to account positive factors in company analysis, such as employment of ethnic minorities, whereas some have concentrated their investments in the environmental area, although, avoidance remains the dominant model in the industry (Sparkes & Cowton, 2004).

In the recent years, socially responsible investment has shifted from margin to mainstream which has led to increasing interest in SRI by institutional investors (Sparkes &

Cowton, 2004). They also argue that in addition to significant growth in SRI, the industry has also matured by getting acceptance from large investment institutions such as pension funds and insurance companies. Earlier, SRI was a niche that got interest only from few specialist retail investment funds. Sparkes and Cowton (2004) argue that corporate executives can no longer ignore ESG factors due to the fact institutional investors are the most important owners of publicly listed companies. Due to the recent shift towards SRI among large institutional investors, SRI funds are gaining bargaining leverage over corporate executives. Social issues will be emphasized in the corporate agenda and thus corporate decision makers must be aware of issues regarding corporate social responsibility. (Sparkes & Cowton, 2004.) However, according to Sandberg et al. (2009) there is a shift toward the term "responsible investment" amongst academics and professionals which reflects opposition toward overweighting the social issues compared to environmental and financial factors. In addition to the emphasis on SRI by institutional investors and corporate executives, the whole asset management industry is facing pressure from regulators to report on how they address SRI issues in some European countries (Alessandrini & Jondeau, 2019).

According to Riedl and Smeets (2017) SRI equity holdings of investors are motivated by social signaling. Investors who talk more about their investments are more likely to hold socially responsible investments. However, the authors find that socially responsible investors donate about 41 percent more to charity than conventional investors. This implies that SRI is not a substitute for charity donations. In addition to social preferences playing an important role in determining socially responsible investing, financial motives also affect whether investors invest in a socially responsible way. The results of Riedl and Smeets (2017) are based on data of individual investors. Although private investors may weigh financial performance less than individual investors, a survey by Amel-Zadeh and Serafeim (2018) finds that the primary motivation of institutional investors for using reported ESG information is the relevance to investment performance.

Riedl and Smeets (2017) add that investors accept higher management fees on SRI funds than on conventional funds. Most SR investors also expect that SRI funds will underperform relative to conventional funds. Thus, some investors are willing to accept lower financial performance from mutual funds that match their social preferences. The authors also find that responsible investors have a longer investment horizon. Those investors who hold their funds longer are more likely to be SR investors as well. Riedl and Smeets (2017) argue that as SRI continues to grow, social preferences may drive up prices of socially responsible companies and lower the prices of sin companies.

2.3 Current SRI markets

According to Lang and Electris (2018) sustainable investments have grown 34% in two years, and at the start of 2018 they were at USD 30.7 trillion globally. The market share of responsible investing has grown in every market expect for Europe where assets held by professional SR investors grew by 11% from 2016 to 2018, but their total share of the overall market declined from 53% to 49%. Professionally managed responsible assets range from 18% in Japan to 63% in Australia and New Zealand. Japan has been the fastest growing region from 2016 to 2018 whereas the three largest regions were Europe, the United States and Japan. (Lang & Electris, 2018.)

Currently, the largest SRI strategy globally is negative screening, followed by ESG integration and shareholder activism. Negative screening employs the exclusion of certain investments based on specific ESG criteria while ESG integration applies environmental, social and governance factors into financial analysis. (Lang & Electris, 2018.) In corporate engagement and shareholder action shareholders use power to influence corporate behavior and decision-making. The three largest regions have different dominant strategies since the most of European SRI uses negative screening, the US market is dominated by ESG integration and shareholder activism is the preferred strategy in Japan. (Lang & Electris, 2018.)

SRI has been a broadly practiced and accepted form of investing in Europe but there are signs that the market is maturing (Lang & Electris, 2018). The authors suggest that this drop may be due to stricter standards and definitions being implemented. In March 2019, the European Parliament adopted rules under its Sustainable Finance Action Plan to require asset managers to standardize their ESG integration disclosure and to use common reporting standards. This is meant to prevent asset managers from overstating their efforts towards sustainable investing. Some European asset managers reported lower SR asset values for the 2018 Eurosif survey than in 2016 anticipating the stricter standards and definitions. (Lang & Electris, 2018.)

In the US, SRI is continuing to expand. According to Lang and Electris (2018) the leading motivation for incorporating ESG criteria into investment process is client demand. Over half of the US money managers also explained their increasing interest in SRI as fulfilling a mission or values, pursuing social or environmental benefits and minimizing risks and fulfilling fiduciary duty. Investor demand for socially responsible assets is increasing and this change in investor values and views may have an impact for the expected performance of responsible investing.

2.4 Performance of socially responsible investing

The key part of responsible investing is corporate social responsibility and at the heart of CSR is the debate of the stakeholder theory versus the stockholder theory. The literature concerning ESG investing is a part of research on how corporate social responsibility effects corporate financial performance. This literature can be separated into four categories.

The first category studies whether investors can form portfolios based on ESG factors. Some researchers study the performance of socially responsible mutual funds relative to their conventional peers, while some form portfolios from individual stocks. The second strand of research addresses the stock market response to news related to ESG

factors by implementing event-study methodology. The third category studies the effect of sustainability and the cost of capital. The last strand studies the relationship between sustainability and operational performance which are usually measured by accounting-based performance measures, such as return on assets (ROA) and return on equity (ROE).

2.4.1 Sin stocks

One subject of which researchers are unanimous is the outperformance exhibited by sin stocks. High expected returns of sin stocks suggest that the cost of capital of these companies is higher than those of responsible firms. Hong and Kacperczyk (2009) hypothesize that due to societal norms some investors abstain from investing in so called sin stocks – publicly traded companies involved in producing such products as alcohol, tobacco and gambling activities. They also find that sin stocks are less held by institutional investors and they are less followed by analysts.

Merton's (1987) work on neglected stocks and segmented markets explains why sin stocks should be cheaper than their comparables. Due to being neglected by institutional investors, the valuations of sin stocks should be depressed. Hong and Kacperczyk (2009) show that sin stocks tend to have lower valuations compared to comparables using price-to-book and price-to-earnings ratios. The valuation ratios of sin stocks are on average 15 to 20% lower than those of comparables. This undervaluation leads to sin stocks having higher expected returns than comparables. The authors find that a portfolio long sin stocks and short their comparables has a return of 0.26% per month after adjusting for a four-factor model consisting of the Fama-French three-factor model with the momentum factor. Also, using cross-sectional regressions controlling for firm characteristics, they find outperformance by sin stocks of 0.29% per month.

Fabozzi et al. (2008) argue that the society sees firms making "bad products" as "bad firms". Some view that "bad firms" are thus bad stocks, although their valuations should only be determined by their risk-reward relationship according to financial theory. They

find that between January 1970 and June 2007 the average sin stock produced an annual return of 19.02% while the average stock market had an average annual return of 7.87%. The sin portfolio outperformed the relevant market index in 35 of 37 years. Their sample consists of 267 stocks in alcohol, tobacco, biotech, adult services, gaming and weapons.

2.4.2 Negative, positive and best-in-class screening

ESG investing is often implemented by using different screening techniques on the investment performance. Negative screening, which is the most common method of SRI, excludes companies if they do business in harmful industries or are associated in non-ethical activities. For example, companies in involved with business areas such as tobacco, alcohol, gambling and firearms are usually excluded. Positive screening includes companies, that have demonstrated corporate social responsibility, in the investment portfolio. Companies are rated based on a set of ESG criteria and based on the rating investors choose the highest-rated companies. Best-in-class is a subclass of positive screening. It includes companies which are socially responsible without sectorial exclusion. Thus, the portfolio is better diversified than portfolios formed using negative or positive screening because best-in-class portfolios are invested in a larger number of industries.

Trinks and Scholtens (2017) examine how the implementation of negative screens affects an investor's portfolio and whether the choice of the screening technique matters for returns. Most previous studies investigate the combination of tobacco, alcohol and gaming stocks whereas Trinks and Scholtens (2017) analyze the returns of fourteen controversial issues for the period 1991 to 2012 in several international markets. The authors do not exclude complete industries as they select at the level of the individual firm. They find that controversial stocks have positive abnormal returns and that negative screening causes financial underperformance. The different value-weighted sin portfolios outperform the market which refers to the Fama-French 4 factor benchmark by 91 to 104 basis

points. Trinks and Scholtens (2017) also argue that screening can reduce the universe of investment objects significantly.

Auer (2016) studies the effect of negative screening on portfolio Sharpe ratios using 2004 to 2012 data of STOXX 600 and ESG ratings from Sustainalytics. Auer (2016) prefers negative screens to positive screening as he finds that the exclusion of unrated stocks provides significantly higher returns than a passive benchmark. The author also finds that additional exclusion based on environmental and social scores neither adds nor destroys portfolio value while the exclusion of poor governance rating firms increases the Sharpe ratio of the portfolio.

Hoepner and Schopohl (2018) analyze the performance of stocks which have been excluded from the portfolios of two leading Nordic investors, Norway's Government Pension Fund-Global and Sweden's AP-funds. They find that the portfolios of excluded stocks underperform relative to the benchmark index of the funds. The authors conclude that exclusionary screens employed by asset managers do not compromise the returns of their fiduciaries – the exclusions neither benefit nor harm the portfolios. Although literature states that exclusionary screening is an outdated method, large institutional investors seem to prefer it (Hoepner & Schopohl, 2018).

Kempf and Osthoff (2007) study the performance of stock portfolios using three different screening techniques employed by socially responsible investors. They form the portfolios by using KLD ratings which measure the social responsibility of a company. The companies are evaluated according to two categories: qualitative and exclusionary criteria. Using the qualitative criteria, they form portfolios via positive screening and best-in-class screening. Exclusionary screens are used for the negative screening. By buying stocks with high ESG ratings and selling stocks with low ESG ratings, investors can achieve high abnormal returns – up to 8.7% per year. Negative screening is not efficient whereas positive screening and best-in-class screening offer the best returns. They also find that best-in-class earns the highest alpha.

Halbritter and Dorfleitner (2015) create ESG portfolios using ESG data of ASSET4 from 2002 to 2011, Bloomberg from 2005 to 2011, and KLD from 1990 to 2011 for the U.S. market. High - low portfolios constructed using ASSET4 data exhibit a positive alpha whereas most of the portfolios formed using Bloomberg data do not exhibit a statistically significant relationship between ESG scores and returns. Only high social score companies generate high statistically significant alphas. The ESG ratings have no effect on abnormal returns when using KLD ratings, either. This result holds for overall ESG scores as well as for individual ESG factors. Even best-in-class method could not generate abnormal returns. The authors argue that the performance results are dependent on the rating approach and the company sample, and thus data based different ESG rating services offer different results. In addition, the use of most recent data is crucial as socially responsible investing has developed immensely during the last decade.

The outperformance of sin stocks should deter investors from negative screening since it would exclude these stocks from their portfolios. Neither the financial theory nor empirical results support negative screening, but still it is the most used form of responsible investing. However, increasingly institutional investors are viewing that negative screening is the weakest form of responsible investing performance-wise (Amel-Zadeh & Serafeim, 2018). Responsible investors could increase their performance by adopting, for example, another screening technique.

2.4.3 Individual ESG factors

The previous studies investigated the effect of overall ESG scores on portfolios. The following papers examine the performance of portfolios formed on individual ESG factors. According to Borgers, Derwall, Koedijk and ter Horst (2013) most asset managers justify their socially responsible investments based on the argument that the implementation of ESG factors into investment processes provides positive effects to the investment performance. However, the evidence on the effect of ESG scores on portfolio performance

is not conclusive. For example, during the 1990s and early 2000s the use of governance scores generated abnormal returns, but since then the effect seems to have disappeared.

The evidence of the effect of use of environmental screens on investment performance is mixed. Derwall, Günster, Bauer and Koedijk (2005) construct and evaluate two equity portfolios based on Innovest Strategic Value Advisors' corporate eco-efficiency scores. They find that the more eco-efficient portfolio generated higher average returns and that it could not be explained by differences in beta, investment style or industry characteristics. Though Derwall et al. (2005) find a positive relationship between corporate eco-efficiency and future returns, Kempf and Osthoff (2005) and Statman and Glushkov (2009) find no evidence of outperformance due to environmental screening using KLD ratings data. Different data sources have different results yet again, as in the study by Halbritter and Dorfleitner (2015).

In addition to environmental screens, the use of social screens has been researched as well. Unlike the performance of environmental screening, social screens have been found to generate high returns from 1984 to 2011, especially using employee satisfaction as a factor. Edmans (2011) investigates the relationship between employee satisfaction and long-run stock returns. Firms with high employee satisfaction earned an annual 4-factor alpha of 3.5% from 1984 to 2009. Edmans (2012) has similar results with an extended sample period. The results are robust to controls for firm characteristics, different weighting methodologies and the removal of outliers. Employee satisfaction is positively correlated with stockholder returns. Also, it seems that the market does not fully value intangibles which implies that social screens can improve the performance of investors. The results of Edmans (2011 & 2012) are consistent with Kempf and Osthoff (2005) and Statman and Glushkov (2009) who found that investing based on KLD scores of employee relations and community can lead to high returns.

In addition to social screens, governance scores have also resulted in abnormal returns. Gompers, Ishii and Metrick (2003) construct a "Governance Index" based on 24

corporate governance provisions for a sample of 1,500 large U.S. firms from 1990 to 1999. This G-index proxies for the strength of shareholder rights. By taking a long-horizon approach as opposed to event-study methodology, they form long-short portfolios based on the G-index. Firms with strong corporate governance have a low G-index while firms with weak shareholder rights have higher G-index. The portfolio is long 10% of the lowest G-index companies while short the highest G-index firms. The authors find that corporate governance has a strong positive relationship with stock returns. The long-short portfolio generated an abnormal return of 8.5% per year.

The relationship between corporate governance and equity prices that Gompers et al. (2003) found in the period of 1990 to 1999 seems to have disappeared during the 2000s. Bebchuk, Cohen and Wang (2013) argue that the disappearance of the relationship is due to the markets learning about the correlation and reflecting the differences between good governance and poor governance companies into their prices. Although the G-index was not able produce abnormal returns during the period of 2000 to 2008, good corporate governance was still reflected in the higher valuation, profitability and growth of these companies.

Gu and Hackbarth (2013) find that the relationship between corporate governance and stock returns is positive and significant for transparent firms whereas the effect is small and insignificant for firms with opaque governance. Their data set covers 2,959 companies during 1990 to 2006, which overlaps the data set of Bebchuk et al. (2013). Gu and Hackbarth (2013) argue that governance and transparency complement each other. The view that transparent firms are more valuable takeover targets is supported by the results of the authors. Acquirers are able to identify synergies and bid more effectively on transparent firms.

It seems that investors were able to use ESG screens to generate higher future returns until 2004 but since then the positive effect of implementing ESG scores seems to have disappeared. Although investors should not expect outperformance using ESG ratings

and governance information, they should not disregard ESG factors in portfolio construction as there is no evidence of SRI underperforming relative to conventional investments.

2.4.4 Socially responsible mutual funds and indices

Another way to measure the performance of socially responsible investing is to research how SRI mutual funds and indices perform compared to their conventional peers, rather than studying how portfolios composed of individual responsible companies perform. Some research suggests that socially responsible funds achieve outperformance compared to conventional funds. However, these results are often not significant.

One of the earliest studies concerning the performance of SR funds is by Hamilton et al. (1993). They have three hypotheses about the relative performance of socially responsible mutual funds and conventional funds. The first states that SR funds have risk-adjusted expected returns that are equal to those of conventional portfolios. Thus, social responsibility of stocks is not priced by investors. The second one has it that the expected returns of SR funds are lower than the expected returns of conventional funds. In this case socially responsible investors have a positive impact on stock prices and thus lowering the expected returns of socially responsible companies. The last hypothesis states that the expected returns of socially responsible mutual funds are higher than those of their conventional peers which is possible if many investors consistently misprice the news of corporate social responsibility. (Hamilton et al., 1993.)

Climent and Soriano (2011) find that by using a matched-pair analysis, U.S. green funds performed poorly compared to conventional mutual funds during 1987 to 2009 (8.45% vs. 12.67%), whereas on a more recent period, 2001 to 2009, green funds were able achieve similar returns to conventional funds. Although green funds underperformed conventional funds, and thus supporting the second hypothesis of Hamilton et al. (1993), they were able to achieve better returns than SRI funds (8.45% vs. 7.19%). During the period, green funds were riskier than SRI funds and conventional funds when measuring

risk by volatility – green funds had an annual volatility of 17.56%, whereas the volatilities of SRI funds and conventional funds were 13.79% and 15.05%, respectively. They also found that green funds were more sensitive to market as they had higher betas, 0.99 while SRI funds had the lowest betas, 0.84. The lower performance of green funds in the first sub-period could be explained by their more restricted investment set or by poor investment selection process. Investors seem to be more willing to pay for green investment products in the form of lower returns compared to conventional investments. (Climent & Soriano, 2011.)

Statman (2000) finds that neither SRI funds nor conventional mutual funds of equal asset size were able to achieve better results than the S&P 500 Index. On average, SRI funds trailed the S&P 500 Index by -5.02 percentage points while conventional funds trailed by -7.45 percentage points. Although SR mutual funds were able to achieve better performance than conventional funds, the difference was not statistically significant. However, Statman (2000) finds that Domini Social Index, a capitalization-weighted index modelled on the S&P 500 Index, consisting of 400 stocks was able to achieve better raw returns and risk-adjusted returns than S&P 500. The results from the comparison between SR and conventional mutual funds support the first hypothesis of Hamilton et al. (1993), while the outperformance by the socially responsible index supports the claim that doing well by doing good is possible.

Using a sample of 89 Australian SRI funds from 1986 to 2005, Jones et al. (2008) state that ethical mutual funds underperform their benchmarks. This underperformance is most considerable during 2000 to 2005. The risk-adjusted returns show that annual underperformance by SRI funds was 1.52% per annum. They conclude that investing in portfolios that are constrained by social, environmental and ethical criteria causes a financial sacrifice for investors. Renneboog et al. (2008) find similar results. The authors apply a multi-factor model to figure out whether investors pay the price when investing in SRI funds or do they get value for their money. Using a data of 440 active and dead equity mutual funds from continental Europe, the US, the UK, Canada and Asia-Pacific,

they conclude that SRI funds underperformed their benchmarks by -2.2% to -6.5%. Excluding some exceptions (France, Japan, Sweden), the risk-adjusted returns of SRI funds were not statistically different from those of conventional funds. They find that fund returns tend to decrease with screening intensity on social and corporate governance criteria. Unlike in the case of conventional funds, the size of the fund does not decrease the performance of SRI funds.

The literature suggests that there is no consensus on the effect of social responsibility on mutual fund performance. However, it should be noted that these studies employ different data sets, periods and even asset pricing models, so the comparison between these studies is hard. Thus, both proponents and opponents of socially responsible mutual funds can both find studies to back up their views on socially responsible investing.

2.4.4 ESG events

Event studies are another method of studying the value of corporate social responsibility. If investors view ESG information as material, corporate efforts in CSR should be observed in event studies. Historically, investments in environmental technologies have been viewed as a cost to the firm, although, there is also support that improved corporate environmental responsibility can enhance financial returns (Fisher-Vanden & Thorburn, 2011). They state that engagement in voluntary environmentally responsible activities is a fast-growing trend in the corporate world. These activities include membership in public voluntary programs that encourage voluntary public disclosure of environmental performance measures and pollution reductions. Fisher-Vanden and Thorburn (2011) are motivated to examine whether better environmental performance is conveyed into better financial performance. The authors study the abnormal stock returns using event study methodology surrounding announcements to join two voluntary environmental programs, the US Environmental Protection Agency's Climate Leaders program and Ceres. The Climate Leaders program targets reductions in greenhouse gas emissions while Ceres involves more general environmental commitments.

Their sample consists of 117 announcements over 1993 to 2008. The authors find significant losses of 1% in the market value of firms following announcements to join the Climate Leaders program. For firms joining Ceres the abnormal returns are insignificant. Fisher-Vanden and Thorburn (2011) find that the stock price declines are larger for companies exhibiting poor corporate governance and that companies with weak corporate governance structures are more likely to join Climate Leaders. The authors argue that these companies join Climate Leaders despite the fact that it lowers shareholder value because they face more pressure from institutional investors or because the managers are not overseen properly by the owners allowing them to join these environmentally conscious programs.

Krüger (2015) studies the shareholder value implications of 2,116 corporate events for the companies' main stakeholders. He shows that investors have a significantly negative response to negative CSR news and that this reaction is especially notable for information concerning communities and the environment. Krüger (2015) argues that stock price declines following negative CSR news are consistent with the position that social responsibility is associated with significant costs. The median cost of negative CSR news is approximately USD 76 million. It is calculated as the product of the median sample market capitalization and the median 21-day cumulative abnormal return. Not only are negative CSR news met with negative abnormal returns, as the release of positive CSR news cause slight negative stock performance as well. As in the case of negative news, positive news are met with higher stock declines in the case of news concerning the environment and communities. Although positive news are not received well by investors either, the abnormal returns are only slightly negative. Still, Krüger (2015) suggests that investors do not appreciate the implementation of CSR policies.

It seems that investors have negative views on CSR as a whole. Positive news are met with stock declines the same as negative news, although positive news are met with slightly lower stock price declines. Investors view corporate social responsibility as a

expenses to a company. Negative CSR news often result in expenses such as fines and reparations whereas investors might not fully understand the benefits of incorporating social responsibility into a company's actions.

2.4.5 Active Ownership

Although most research on responsible investing assumes that investors are active in their stock selection process and passive thereafter as owners who do not try to engage with the management directly. However, some socially responsible investors act as active owners by trying to influence management behavior and by exercising their rights as owners.

Dimson et al. (2015) argue that despite growing interest in active ownership, data limitations restrict the ability to answer which firms are the target of active engagement, and how these engagements are carried out. By using an extensive proprietary database consisting of CSR engagements with US public companies from 1999 to 2009 provided by a large institutional investor, they find that active ownership concerning ESG issues can be value enhancing. The sample of Dimson et al. (2015) consists of 382 successful and 1,770 unsuccessful engagement for 613 companies. Market reaction to ESG activism is positive as these engagements generate a cumulative size-adjusted abnormal returns of 2.3% over the year following the initial engagement. The results for successful engagements are even more promising, as they find that cumulative abnormal returns for them are 7.1%.

2.4.6 SRI performance during market crises

According to Guiso et al. (2008) investors factor in the risk of being cheated when deciding whether to enter the stock market. They find evidence that lack of trust is an important factor in explaining the limited participation in the stock market. Investment in

stocks requires an assessment of the risk-return trade-off and sufficient data to complete this assessment. However, another important factor is the trust that the data are reliable, and that the system is fair. The authors find that trust has a large positive effect on stock market participation, whereas lack of trust reduces the demand for stocks. (Guiso et al., 2008.) Their findings can also explain some of the SRI performance during bear markets and market crashes.

Lins et al. (2017) study the value of corporate social responsibility during the 2008 – 2009 financial crisis by examining the performance of 1,673 nonfinancial firms with CSR data. The authors find that firms with high CSR ratings had significantly higher – between four and seven percentage points – stock returns during the crisis than those firms that had low CSR ratings. The authors argue that the effect of social capital in explaining stock returns is at least half as large as the effect of financial variables, such as cash holdings and leverage. In addition, they tested the performance of high-CSR firms during non-crisis periods. Their models show, however, that CSR affects returns only during the crisis period. Even during the recovery period after the crisis there was no difference in the stock returns between high- and low-CSR firms. It seems that investors value the social capital of high-CSR firms during a crisis of trust which translates into outperformance during crisis periods. Investment in a high-CSR firm can be viewed as a sort of an insurance policy that pays off when the economy suffers from severe lack of confidence. (Lins et al., 2017.)

Nofsinger and Varma (2014) find similar results to Lins et al. (2017) in that socially responsible investments add value by outperforming during periods of market crises. In crisis periods SRI funds outperform by 1.61 – 1.75%. Here, the selection of the factor model makes a difference. However, the authors find that this outperformance comes at a cost of underperformance during non-crisis periods whereas Lins et al. (2017) did not find any evidence of underperformance after the crisis period. In non-crisis periods responsible funds underperform by 0.67 – 0.95 %. Nofsinger and Varma (2014) state that this asymmetric return pattern is especially found in ESG funds that use positive screening whereas SRI funds focusing on sin stocks or funds that focus on religious principles

do not outperform in crisis periods. This makes the case for advocating positive screening over exclusion even more compelling.

Kim et al. (2014) offer another way of studying the relationship between corporate social responsibility and stock price crash risk. Crash is defined as the conditional skewness of return distribution and it captures asymmetry in risk. Higher standard of transparency and lower engagement in hoarding bad news by socially responsible firms is hypothesized to lead to lower crash price. By using a large sample of US public firms from 1995 to 2009 they find that CSR performance has a negative relationship with future crash risk after controlling for other predictors of stock price crash risk. CSR has the most powerful mitigating effect on firms with lower standards of corporate governance. Companies with strong CSR focus are less likely to conceal bad news, which leads to lower stock price crash risk. (Kim et al., 2014.)

Trust is essential in financial markets and its benefits can be seen from the performance of ESG investing during market conditions when overall trust in the markets is low. Investors trust the data coming from socially responsible companies and thus they are not overreacting to bad news. Although the literature supports the view that socially responsible investments may provide some protection during market downturns, the literature is not unanimous on the outperformance during non-crisis periods.

2.5 CSR and financial performance

Growing interest in ESG issues has increased the amount of research on the relationship between CSR and financial performance. One of the only areas of agreement in the ESG literature is about the effects of CSR on the cost of capital. Companies with higher ESG scores tend to have lower cost of equity capital, higher credit ratings and be able to borrow with lower interest rates. Socially responsible companies are thus viewed as less risky by debt and equity investors which in turn implies that the expected returns of these companies are also lower.

2.5.1 Cost of capital

Using a sample of 12,915 US firm-year observations from 1992 to 2007, El Ghoul et al. (2011) examine whether CSR affects the cost of equity capital. They argue that if socially responsible firms are viewed as less risky, then these firms should have lower cost of equity. Higher investor base should also lower the cost of equity capital for these firms. El Ghoul et al. (2011) find that after controlling for other firm-specific determinants as well as industry and year fixed-effects, firms with higher CSR scores have lower cost of equity capital. Thus, managers should pursue CSR-related activities as they lower financing costs as well as benefit the society at large. By being good corporate citizens companies can attract a larger investor base and further decrease their cost of equity. They conclude that sin stocks related to the tobacco and nuclear power industries exhibit significantly higher costs of equity capital. Thus, they confirm the findings of Hong and Kacperczyk (2009) that sin stocks have higher expected returns.

Chava (2014) studies the effect of a firm's environmental profile on its cost of equity and debt capital. The implied cost of capital, derived from analysts' earnings estimates, is significantly higher on stocks excluded by environmental screens compared to non-screened companies. Not only does CSR influence cost of equity but cost of debt is affected as well as firms with environmental concerns are charged a significantly higher interest rates on their bank loans. These companies are also avoided by institutional investors and banks, as Chava (2014) finds that their institutional ownership is lower and fewer banks are ready to loan them funds.

Goss and Roberts (2011) study the effect of CSR on the cost of bank loans. Their sample consists of 3,996 loans to US firms. They have similar results to Chava (2014) in that companies with below average ESG records pay between 7 and 18 basis points more than socially responsible firms. In addition to Goss and Roberts (2011) and Chava (2014),

Sharfman and Fernando (2008) find that firms with better environmental risk management exhibit lower costs of capital.

Investors view that lacking concerns toward CSR, especially environmental issues, can cause severe risks for a company. Corporate managements should consider involving ESG issues into their processes in order to lower the cost of capital. Companies which ignore corporate social responsibility face higher cost of capital and may be disregarded by institutional investors. As responsible investing and sustainable banking grow, poor corporate citizenship will be penalized which will further increase the cost of capital for these companies.

2.5.2 CSR and accounting performance

While partaking in corporate social responsibility results in costs for the company, recent research suggests that ESG activities and accounting performance have a positive relationship. The benefits of CSR outweigh the costs of it in the form of higher profitability.

According to Kim and Statman (2012) proponents of corporate environmental responsibility (CER) claim that companies can improve their financial performance by increasing their investment in CER. Opponents of this view state that by reducing their investment in environmental responsibility, companies can have better financial performance. The third view on this topic is that CER investments by companies are increased when it improves financial performance, and these investments are reduced when a decrease leads to a higher level of financial performance. The results of Kim and Statman (2012) suggest that corporations adjust their investments in CER to maximize profits. Using KLD data from 1991 to 2000 they find that corporations which increased their level of CER and lowered it had subsequent increases in their profitability, as measured by return on assets, while companies which did not change their levels of CER had significantly lower profitability.

Barnett and Salomon (2012) hypothesize that the relationship between CSR and corporate financial performance (CFP) is U-shaped. Moderate level of corporate social performance (CSP) is worse for financial performance than low or high level of CSP. By using an unbalanced panel of 1,214 firms and 4,730 firm-year observations from 1998 to 2006 and after controlling for a variety of firm, industry and year effects, the authors find support for a U-shaped relationship. When a company's overall KLD net score increases, its ROA and net income have an initial decline, and an increase thereafter. However, Barnett and Salomon (2012) continue that this relationship is not symmetrical, as those firms with the highest net KLD scores had significantly higher ROAs than those with the lowest responsibility scores.

Jiao (2010) studies the effect of stakeholder welfare on firm valuation using KLD data. The final sample consists of 4,027 observations for 822 firms. Although the focus of the study is the relationship between Tobin's Q and a constructed stakeholder welfare score, Jiao (2010) offers insight into the relationship between accounting measures, mainly profit margin and return on assets, and the stakeholder welfare score. Univariate tests reveal that ROA is higher for high stakeholder welfare group than low stakeholder welfare group and that this difference is highly statistically significant. In the case of profit margin, Jiao (2010) finds that overall stakeholder welfare score indicates a higher profit margin, based on the results from two-stage least squares regressions. The results are similar for individual responsibility scores such as community relations, environmental performance and employee relations, where employee relations has the highest level of significance.

3 Theoretical framework of socially responsible investing

Proponents of socially responsible investing argue that doing well by doing good is possible. Moskowitz (1972) was one of the first to argue that the risk-return relationship is not the only aspect that explains portfolio performance. Socially aware investors state that corporate social performance has a positive effect on corporate financial performance. Literature endorses this statement as socially responsible companies are found to have higher profitability and lower cost of capital than conventional companies. SRI should perform better than conventional investments if investors misprice the information concerning CSR. If investors overweigh socially responsible investments their expected returns should be lower in the future.

Opponents of SRI view that it restricts the investment universe and consequently leads to a lower level of diversification and performance. This view is justified by the outperformance of sin stocks. Socially responsible investors exclude these stocks from their portfolios which drives the expected return of sin stocks higher. However, portfolios using screening techniques such as best-in-class are diversified across industries which mitigates the diversification argument. Best-in-class has often generated the highest alpha of different screening techniques (e.g. Kempf & Osthoff 2007) whereas the use of exclusionary screens has been found not to compromise the returns (Hoepner & Schopohl 2018).

3.1 Corporate perspective

The corporate perspective on social responsibility studies the effect of CSR on companies from the viewpoint of the company. The neoclassical view of ESG engagements is that they are a cost to shareholders by requiring the consumption of the corporation's resources. According to Friedman's (1970) shareholder model the only social responsibility of a company is the maximization of shareholder value. Stakeholder view takes other stakeholders, such as employees, customers and suppliers, into consideration in

corporate decision-making as well. According to Goodpaster (1991) the term "stakeholder" has been invented in the early 1960s to signify that there are other parties in addition to stockholders who have a stake in the modern publicly listed corporation. In addition to these opposite views, instrumental stakeholder theory tries to combine these views in that shareholders' value is maximized in the long term by recognizing the interests of all stakeholders.

3.1.1 Shareholder, stakeholder and instrumental stakeholder

Smith (2003) argues that the shareholder and stakeholder theories are normative theories of corporate social responsibility. Not only do they dictate what a corporation's role should be in the society, but they can also be seen as normative theories of business ethics – executives and managers should act accordingly to the "right" theory. The main difference between the two theories is that the stakeholder theory insists that managers take into consideration the interests of all stakeholders even if it reduces profitability of a company. (Smith 2003.)

Dodd (1932) was one of the first to claim that the modern corporation should be involved in social responsibility in addition to its profit-making function, and that corporate managers should take the interests of other stakeholders into consideration. According to Dodd (1932) there was a growing feeling among business leaders that business should voluntarily take care of its responsibilities to the community already in the first half of the 20th century. Managers should not wait for legal compulsion regarding social responsibility. Dodd (1932) argues that when business managers take the welfare of its customers and employees into consideration, it will in the long run increase the company's profits. Lack of security felt by workers was largely responsible for the under-consumption during the Great Depression (Dodd 1932).

Friedman (1970) argues that in a capitalistic system a corporate executive is an employee of the owners of the business. The sole responsibility of the executives is to their

employers. The criterion of performance is straight-forward but Friedman (1970) states that basic rules of the society steer the executives. While acting as an agent rather than as a principal, executives should be deterred from social responsibilities because they are spending the money and time of their employers (Friedman, 1970) – corporate social responsibility is seen as being caused by agency conflicts and moral hazard and it can cause agency costs. Executives should not reduce pollution beyond the amount that is optimal for the corporation or required by law. Friedman (1970) argues that this case would entail using the someone else's money to achieve a social objective while reducing stockholder returns, implying that there is a trade-off between CSR activities and financial performance. In effect, the executive is thus imposing taxes and deciding where to use the proceeds. According to Friedman (1970) taxation and expenditure of tax income are functions of a government whereas while the executive takes part in corporate social responsibility, she is simultaneously deciding whom to tax and where to use the proceeds. Thus, there is no system of checks and balances overseeing the process. Friedman (1970) states that then the executive becomes a public employee, even though she is still an employee of a private enterprise.

Furthermore, Friedman (1970) brings up that corporate social responsibility is often used as a justification for actions rather than a reason for those actions. He makes an argument that, for example, it may be in the long-run interests of a corporation that is a major employer in a community to improve the community and offer it amenities. This is done entirely of its own self-interest although it could be rationalized as social responsibility. Therefore, Friedman does not prohibit companies from social responsibility – but it should be a byproduct of the company's actions, not the goal. Although CSR is often viewed as incompatible with the view of shareholder value maximization, Friedman does not forbid it – as long as it benefits the shareholders.

One of the main opponents of a multi-fiduciary stakeholder approach, Goodpaster (1991), states that the relationship between the management and stakeholders is ethically different from the relationship between the management and the stockholders. He

claims that the management has nonfiduciary duties to other stakeholders whereas the fiduciary duty of a corporation is to its shareholders alone. Goodpaster (1991) argues that this fact is not considered by the stakeholder theory. He emphasizes that although the relationship is different between stakeholders and managers, the other parties do not lack a morally significant relationship to the management. Goodpaster (1991 continues that this only means that the relationship is not fiduciary in nature.

According to Smith (2003) the shareholder theory is often misrepresented. Sometimes it is considered as urging managers and executives to make profit by any means. The theory is also criticized as weighting short-term term profit maximization more than the long-run benefits. Still, Friedman (1970) emphasizes that short-term profit maximization should be foregone if it impedes the long-term shareholder value maximization.

The stockholder theory of Friedman (1970) is challenged by the stakeholder theory of Freeman (1984). The stakeholder theory offers an alternative to the narrow view of Friedman by stating that corporate success should be viewed more broadly through the lens of sustainable growth and the consideration of ESG issues. Smith (2003) states that according to the stakeholder theory managers have a dual duty to both the corporation's shareholders as well as the stakeholders. However, there is ambiguity regarding which stakeholders are to be considered, but most interpretations refer to at least stockholders, customers, employees, suppliers and the local community. The theory states that managers are agents of all stakeholders, not only of stockholders. The objective of the managers is to maximize profit while ensuring the long-term ability of the corporation to remain a going concern. (Smith 2003.)

According to Freeman et al. (2004) the main assumption of the stakeholder theory is that values are a necessary part of doing business. The theory asks the managers to be clear about what brings its core stakeholders together and how the managers want to do business. The authors argue that this shared sense of the value the stakeholders create brings them together and allows the company to generate excellent financial

performance as well as in terms of its purpose. By developing relationships and building communities, the managers are able to best deliver the value the firm promises. Contrary to shareholder theory, profits are the result from the value creating process rather than the driver – doing well by doing good. (Freeman et. al 2004.) In addition, risk management should incorporate environmental and social risks beside merely financial risks.

Just like the stockholder theory, the stakeholder theory is sometimes misunderstood. Sometimes it is claimed that the theory does not emphasize focus on company profitability (Smith 2003). However, the author argues that the theory's ultimate objective – the concern's continued existence – is only achieved by balancing the interests of all stakeholders, whose interests are usually satisfied through profits (Smith 2003). By adopting the stakeholder view, corporations would be able to observe their impact on the society in addition to financial aspects.

Instrumental stakeholder theory views the shareholder view and the stakeholder view as mutually inclusive. The theory has it that corporate social responsibility has positive effects on corporate financial performance through, for example, reputational effects and employee satisfaction. Turban and Greening (1997) hypothesize that an organization's corporate social performance may attract potential applicants by signaling on working conditions under incomplete information. They suggest that companies can achieve competitive advantage by attracting a larger applicant pool. Peterson (2004) examines how the perceived CSP of an employer affects its employees. The results show that the employer's commitment to CSR is associated with higher organizational commitment – especially in the case of female employees. Lacey and Kennett-Hensel (2010) also find that CSR initiatives can build trust between a firm and its customers and thus lead to committed customer relationships. Not only does superior corporate social performance benefit the stakeholders of a company, but it can also lead to a competitive advantage to the firm resulting in better financial performance.

3.1.2 Risk mitigation

Not only does CSR affect the financial performance of companies, but it can also be examined from the viewpoint of risk mitigation. By improving corporate social performance companies can reduce their sensitivity to negative news, business cycles and economic shocks. Godfrey et al. (2009) hypothesize that when facing a negative event, the decline in shareholder value is smaller in the case of high CSP companies. This insurance-like property of CSR stems from moral capital. Companies which exhibit low levels of moral capital are punished by stakeholders when negative news emerge. By implementing event-study methodology, Godfrey et al. (2009) find that CSR participation has an insurance-like effect when a company faces negative firm-specific news. Oikonomou et al. (2012) hypothesize that CSP influences negatively market risk at the firm level. They find that there is a negative but insignificant relationship between CSP and systematic financial risk. However, when investigating the relationship during times of low volatility, high CSR companies exhibit lower levels of market risk, and during times of high volatility, socially irresponsible companies are characterized by higher levels of systematic risk.

While the shareholder viewpoint sees CSR as an agency cost to shareholders, doing well by doing good, as suggested by the stakeholder theory, is possible through the positive effects of corporate social performance on corporate financial performance. When taking the positive effects and risk mitigative properties of CSR into account, it seems that managers do a disservice to the company when they fail to incorporate social responsibility and stakeholder approach to their decision-making processes.

3.2 Investor perspective

This section summarizes the theorical background of risk, return and valuation of responsible investments and provides another way to view the effect of social responsibility in finance, is through the perspective of an investor. The classical financial theory views that capital markets are efficient and that the portfolios of investors are well-

diversified regarding firm-specific risks. Thus, the exclusion of stocks with higher expected returns due to low ESG performance should lead to lower returns for the investor. Socially responsible portfolios are then under-diversified due to an additional constraint in mean-variance portfolio optimization models. If corporate social responsibility influences corporate financial performance or firm risk, ESG information should be incorporated into investment decision-making – this information is considered in the risk-return relationship of an investment. This viewpoint takes the materiality of ESG information into consideration. The degree to which investors take these non-financial issues into consideration affects the performance of responsible investments. Investors should also consider the risk mitigative properties of responsible investing as some views suggest that responsible investment experience lower tail-risk.

According to the efficient market hypothesis (EMH), stocks already reflect all available information (Fama 1970). Abnormal returns, or alpha generation, are not possible since all information is public, and thus available for everyone. According to this hypothesis, higher returns are only achieved when higher risks are taken. If high-ESG stocks have higher returns, it is due to them having higher systematic risk, and vice versa.

There are three versions of the EMH, and they differ by their definition of "all available information." The weak form hypothesis states that "all available information" refers to information that is uncovered by investigating market trading data such as historical stock prices and trading volumes. According to the weak-form, technical analysis is pointless. The semistrong form maintains that all public information, including fundamental information on management's quality, earnings forecasts and dividend payments, is reflected in stock prices. The third version of the EMH is the strong form. It states that all information, including insider information, is already priced in the markets. (Fama 1970.)

Active portfolio management, including fundamental analysis and trend following, is a wasted effort according to the proponents of the efficient market hypothesis. Instead, they advocate passive investing by following the market. On a risk-adjusted basis, active

mutual funds should not be able outperform the market, especially net of costs. Thus, it should be expected that the conventional and responsible mutual funds examined in this thesis should have statistically insignificant alphas.

Modern portfolio theory asserts that in the equilibrium an asset's expected excess return depends on its exposure to systematic risk, or beta (Lintner 1965). If investors view ESG information as material to assessment of systematic risk or future cash flows, then ESG information will be factored in asset prices immediately, if the markets are efficient (Fama 1970). However, Merton (1987) argues that financial markets may exhibit anomalies due to incomplete information. If investors' opinions on, for example, ESG information differ, Fama and French (2007) state that informed investors generate positive alpha, while misinformed have negative alphas. Informed investors also make asset prices more rational.

If investors have a neoclassical view – that CSR is considered an agency cost – then ESG news should elicit a negative reaction. If investors believe that CSR engagements are beneficiary for corporate financial performance, then this kind of news should have a positive stock price reaction. Either way, ESG information expands the information set of investors, which then can be used in the investment decision-making process and informed investors can benefit from adapting to this new material information, thus pricing ESG information. However, if investors as a whole disregard information concerning social, environmental and governance news, then markets are not efficient, and investors are subject to systematic risk that they are not considering. In this case, investors underestimate the effects of global issues, such as climate change, on systematic risk. Investors may also ignore the unsystematic risks of ESG issues.

Instead of solely focusing on systematic risk, investors should take total risk of a stock into consideration. Total risk is based upon a stock's systematic risk and firm-specific risk. In efficient markets investors assumed to optimize their portfolios using Markowitz' (1952) expected returns - variance of returns rule. Using this rule investors can eliminate

firm-specific risk by diversifying their portfolios. Investors can reduce the total risk of their investments by holding a portfolio of different securities instead of just placing their money in one type of assets. A limited investment universe means limited diversification opportunities, which should ultimately lead to lower risk-adjusted returns. When this is implemented to negative screening, this additional constraint on the optimization should lead to worse performance. These value-based views undermine the effect of diversification by excluding stocks with higher expected returns, such as sin stocks (Hong & Kazperczyk, 2009). These non-responsible stocks are left out of the portfolio and thus the portfolio's expected return is worse than that of a non-constrained one (Fama & French, 2007). In empirical studies, such as Kempf and Osthoff (2007), this can be seen as the underperformance of negative screens. However, when investigating SRI funds as a whole, they seem to achieve similar to returns to conventional funds – the performance of SRI funds cannot be told apart from that of their conventional peers. But neither class of funds do outperform their benchmarks.

Recent studies have started implementing only material ESG ratings when investigating the performance of responsible investing. Khan et al. (2015) compare the returns of two stock portfolios. The first consists of companies which rate high on ESG issues which are deemed material for its sector. The second is formed from companies which have low ESG ratings. The first portfolio significantly outperforms the second one, which indicates that investors should pay attention to material ESG issues. Material ESG factors can affect future cash flows or risks which are not reflected in current market prices. Informed investors can thus generate abnormal returns and benefit from the higher risk-return relationship through mispricing of growth potential and future cash flows and risks by the market.

Pedersen et al. (2019) view that there are two lines of literature concerning the performance of responsible investing. The first states that ESG decreases investment performance and it is supported by empirical evidence of outperformance by "sin stocks" (Hong & Kacperzcyk, 2009). The second line shows that stocks with good governance

(Gompers et al., 2003) as well as stocks with high employee satisfaction (Edmans, 2011; Edmans, 2012) show sustainable abnormal returns. Pedersen et al. (2019) state that if ESG predicts future firm profitability, then it should also forecast high expected returns if the market does not price ESG information correctly. However, this requires that ESG also predicts investor demand. The authors propose theory which explains two effects of ESG scores of stocks. First, ESG scores provide information on a firm's fundamentals. The second part of the theory explains how ESG scores affect investor preferences.

Pedersen et al. (2019) consider three types of investors based on their view of ESG scores. Investors of the first type, type-U, are unaware of ESG scores and their goal is to maximize their mean-variance utility. The second group of investors, type-A, are ESG-aware who also have M-V preferences, but they implement ESG scores in their investment decision making – ESG affects their view on risk and expected return. The last type, type-M, are ESG-motivated. They use ESG information and prefer high ESG score stocks.

Figure 1 shows an ESG-Sharpe ratio frontier (A) constructed by the authors by computing the highest attainable Sharpe ratio (SR) for each level of ESG. Type-A investors choose the "tangency portfolio using ESG information" – they maximize their SR. Point B characterizes this tangency portfolio and it maximizes Sharpe ratio. ESG-motivated type-M investors choose their portfolio right of this tangency portfolio from the ESG-efficient frontier, point C, or the area left of B. The ESG-unaware investors choose a portfolio below the ESG-SR frontier (point D), as they ignore the information provided by the ESG scores. Point E expresses individual assets.

Pedersen et al. (2019) also provide expected returns given by an ESG-adjusted CAPM (Figure 2). When many investors are type-U, and assuming that high ESG scores predict high expected returns, the figure shows that high-ESG stocks earn high expected excess returns. The prices of profitable high-ESG stocks are not driven up by type-U investors, which explains the high expected returns. In an opposite situation the expected returns of ESG-motivated investors are low, if these investors form the majority. In the third case

ESG-aware investors bid up the prices of high-ESG stocks to a level which reflects their expected returns. Thus, the relationship between ESG scores and expected returns disappears.

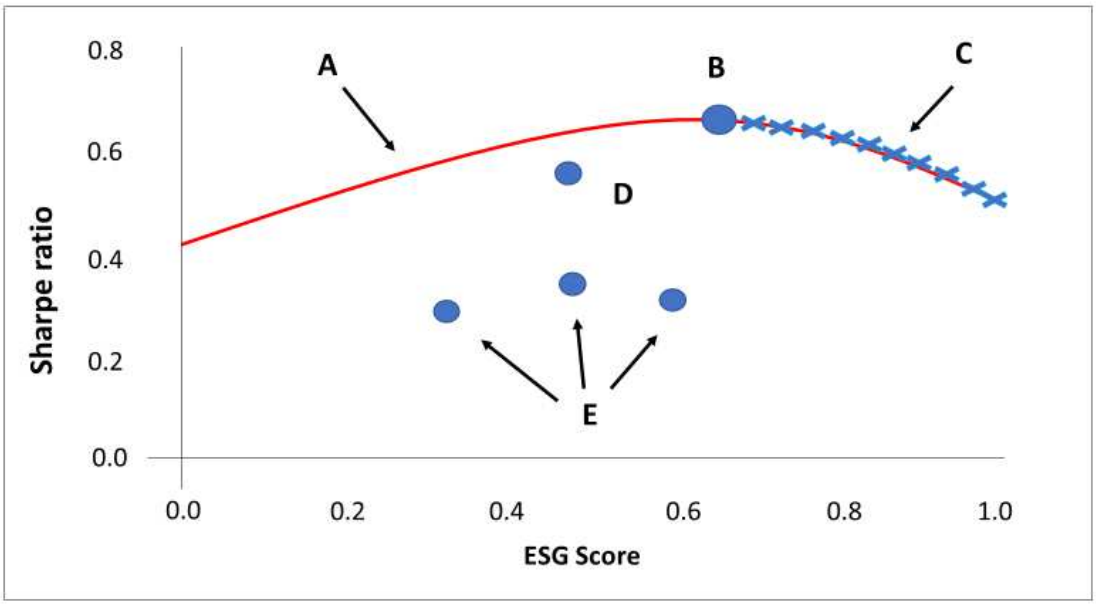

Figure 1. ESG-Sharpe ratio frontier, adapted from Pedersen et al. (2019).

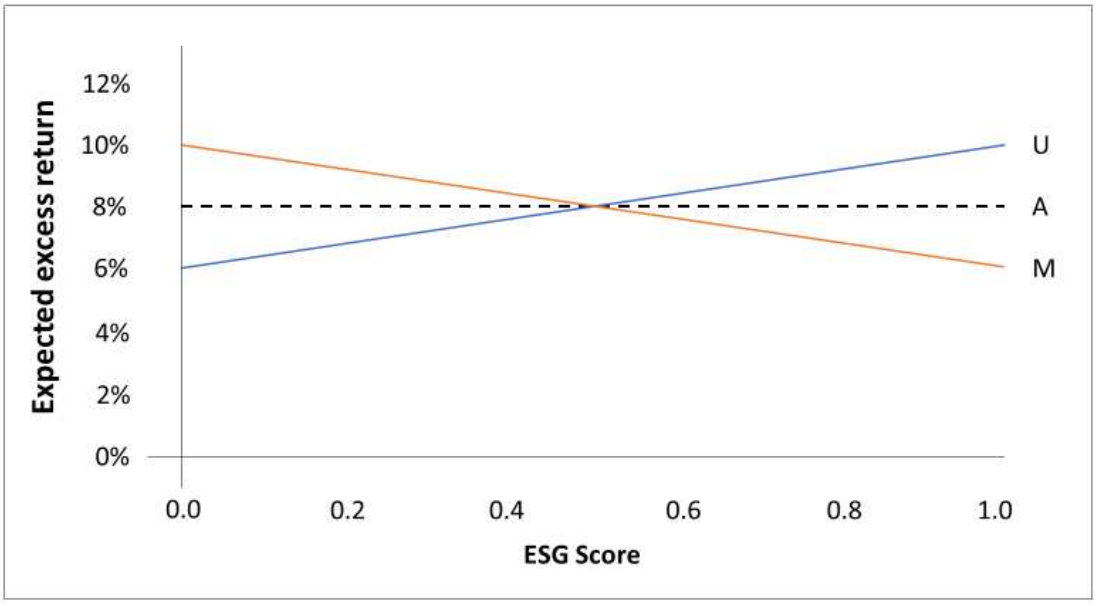

Figure 2. ESG-CAPM, adapted from Pedersen et al. (2019).

Giese et al. (2019) use discounted cash flow framework to help explain the effect of ESG factors on a company's equity valuation by examining future cash flows, risk and cost of capital. DCF models calculate the fundamental value of a company as the present value of its future cash flows which are discounted at an appropriate cost of capital:

$$PV = \Sigma \frac{CF_t}{(1+r)^t}, \quad (1)$$

where *PV* is the present value of the company, CF_t is a cash flow at time *t* and *r* is the cost of capital.

Gregory (2014) state that cost of equity depends on risk and that it is important to separate firm-specific risk and systematic risk. They continue that systematic risk is often macro-economic in nature – economic growth rate shocks, interest rates, and oil price shocks all affect the majority of stocks. They contrast systematic risk with firm-specific risk which is particular to a company. This distinction is crucial for investors since investors can eliminate firm-specific risk via diversification. The required rate of return for investors, or cost of capital, is then determined by systematic risk. (Gregory et al., 2014.) Giese et al. (2019) argue that firm-specific risk is considered in the future cash flows of a company whereas systematic risk is considered while computing the cost of capital in a DCF model – markets are not indifferent to firm-specific risk.

Giese et al. (2019) distinguish three transmission channels which can explain how ESG characteristics influence companies. Two of the transmission channels transmit through idiosyncratic risk – the transmission of ESG into future cash flows and the transmission to firm-specific downside risk protection. The last remaining channel shows the effect of ESG on company valuation though systematic risk. Giese et al. (2019) summarize the first idiosyncratic transmission channel from the work of Gregory et al. (2014) as follows (Figure 3). Companies with high ESG scores have a competitive advantage through efficient use of resources, better human capital development or better innovation management. These companies use their competitive advantage to achieve higher profitability. Last,

this higher profitability leads to higher dividends. Ceteris paribus, this leads to higher investment returns.

Figure 3. Cash-flow transmission channel (Giese et al. 2019).

According to Giese et al. (2019) the second transmission channel connects strong ESG characteristics with lower tail risk (Figure 4). Responsible companies have better risk management standards and they can reduce risk through CSR engagements (Jo & Na 2012). These companies are not as affected by negative news as low ESG-rated peers (Hong & Kacperczyk, 2009). These incidents can have seriously detrimental effects on company value. Thus, Giese et al. (2019) argue that less-frequent risk incidents should reduce tail risk of a company's stock price.

Figure 4. Idiosyncratic risk channel (Giese et al. 2019).

The last transmission channel explains how high ESG performance leads to higher valuations (Figure 5). Using a CAPM framework investors can calculate a required rate of return for a stock:

$$E(R_i) = r_f + \beta_i\,[E(R_m) - r_f], \tag{2}$$

where $E(R_i)$ is the expected return of a stock i, r_f is the risk-free rate, β_i is the market sensitivity of a stock and $E(R_m)$ is the expected market return. Higher systematic risk, represented by market sensitivity of a stock, leads to higher rate of return required by investors and vice versa. As Gregory et al. (2014) argue that responsible companies show

lower systematic risk then investors require a lower rate of return. These companies have then a lower cost of capital which in a DCF model leads to a higher valuation (Giese et al., 2019).

Figure 5. Valuation channel, (Giese et al. 2019).

If high ESG performance is related to lower tail risk, investors may be willing to pay a premium for responsible companies during good times to outperform during market crashes. Moskowitz (2000) states that active mutual funds appear to outperform during recessions – when investors care about performance the most. Moreover, according to the prospect theory by Kahneman and Tversky (1979), investors are more affected by losses negatively than by a gain of the same size positively. Thus, investors prefer a portfolio with asymmetric performance, because they get a higher utility by outperforming during market drawdown than what they lose underperforming during a bull market. If responsible investing can mitigate the size of a drawdown of a portfolio, then according to the prospect theory investors can improve their utilities by investing responsibly.

4 Data and methodology

The next sections of this thesis empirically investigate the performance of socially responsible investing and the insurance-like features of these investments. Asset pricing literature has a long history of measuring mutual fund performance and thus this thesis follows earlier papers by implementing similar asset pricing models and other methods. Definitions for the data and methodology employed in this thesis are explained in the next subchapters.

4.1 Data description

As this thesis compares the investment performance of socially responsible equity funds and that of their conventional peers, an original sample of 357 SRI funds and 500 conventional equity funds was collected from Thomson Reuters Eikon's Datastream database. All of the funds were based in the US. The samples included price data from December 1999 to October 2019 inception dates for these funds. SRI funds have distinct fund names which were used as search terms to conduct a list of responsible equity funds. These search terms were "*responsible"*, "*environmental"*, *"ESG"*, "*ethical"*, "*social"*, "*SRI*"*,* and *"sustainable*"*.* After excluding duplicate funds and non-equity, such as fixed income, balanced and money-market mutual funds, the filtered sample includes 110 SRI funds and 120 non-SRI funds.

The data was augmented with information on assets under management, expense ratios, turnover statistics and investment styles of these funds. This information was collected from the Morningstar mutual fund database. Table 1 presents these characteristics of the mutual funds used in this analysis. Responsible funds are younger than their conventional peers and have much less assets under management (AUM). The conventional funds include a few funds with several billions under management which skews the average AUM. Although the difference is much smaller between the median AUMs, still the responsible funds are much smaller. The average expense ratio is a little higher for

responsible funds, but when measuring median expense ratios, responsible funds have slightly lower expense ratios. The same repeats with turnover ratios as responsible funds have higher average turnover ratios but lower median turnover ratios. This could be explained by a higher amount of passively managed funds in the responsible fund sample.

Table 1. Characteristics of SRI and non-SRI equity funds

	No. Funds	Mean age	Mean AUM	Mean expense ratio (%)	Average turnover (%)
SRI (1)	110	12.81	1081.42	1.06	51.97
Non-SRI (2)	120	19.44	16248.60	0.98	45.17
(1) - (2)		-6.63	-15167.18	0.08	6.80
	No. Funds	Median age	Median AUM	Median expense ratio (%)	Median turnover (%)
SRI (1)	110	12.40	128.60	0.90	31.00
Non-SRI (2)	120	15.83	877.30	0.99	37.00
(1) - (2)		-3.43	-748.70	-0.09	-6.00

The fund database of Morningstar categorizes mutual funds into several investment styles. The nine investment-style classes form a nine-square grid by classifying a mutual fund by its target market capitalization and according to its emphasis on value or growth factors. This matrix is called Morningstar Style Box and it is depicted in Figure 6. On the vertical axis funds are defined into three size categories – small, mid-size and large. Morningstar (2008) defines large-cap stocks as the group that forms the top 70% of the capitalization of each geographic area. Mid-cap stocks are defined as the next 20% and small cap-stocks represent the last 10%. The portfolios of mutual funds define their designation as large, mid or small-cap oriented funds. On the vertical axis funds are defined as growth, value or blend, which is composed of a mixture of growth and value stocks. Stocks are designated as growth or value by comparing them to other stocks of the same capitalization band and are then scored by their characteristics, which include both forward looking measures and historical-based accounting and valuation ratios. (Morningstar, 2008.)

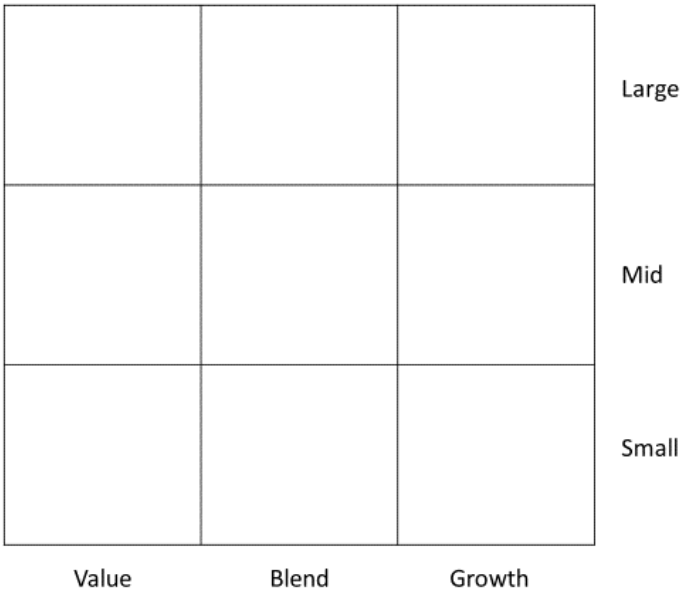

Figure 6. Morningstar Style Box, adapted from Morningstar (2008).

Table 2 compares the frequencies of different investment styles and target market capitalizations of SRI and non-SRI mutual funds based on their designation by Morningstar Style Box. Responsible funds of the sample are not represented in the small-cap classes while 13 of the non-SRI funds are invested in small-cap stocks. The share of SRI funds invested in mid-cap stocks is also low compared to large-cap. Non-SRI funds are similarly more invested in mid-cap stocks than in small-cap stocks. However, both fund groups are mostly invested in large-cap stocks. SRI funds do not emphasize value stocks over growth stocks, since their investment style is mostly considered as blend. For non-SRI the distribution between value, blend and growth is much more balanced, except for large-cap stocks, where value stocks are underrepresented. Further analysis using multi-factor models also describes the underlying factor exposures of SRI and non-SRI funds. This analysis can be used to investigate the investment styles of SRI and non-SRI as entireties.

Since this research studies the insurance-like properties of responsible investing, several periods of market crises, bear markets and corrections, are located. Table 3 represents the performance of S&P 500 index during the last two bear markets and all seven market corrections of the 2000s. Bear markets are defined as market drawdowns of at least 20%

and market corrections are defined as market decline of at least 10% from peak to through.

Table 2. Summary of investment styles of SRI and non-SRI equity funds

	SRI	Non-SRI	Difference
Investment style	Frequency	Frequency	Frequency
Large Value	6 (9.0%)	10 (10.5%)	-4 (-1.5%)
Large Blend	38 (56.7%)	28 (29.5%)	10 (27.2%)
Large Growth	14 (20.9%)	22 (23.2%)	-8 (-2.3%)
Mid Value	1 (1.5%)	8 (8.4%)	-7 (-6.9%)
Mid Blend	5 (7.5%)	6 (6.3%)	-1 (1.2%)
Mid Growth	3 (4.5%)	8 (8.4%)	-5 (-3.9%)
Small Value	0 (0.0%)	2 (2.1%)	-2 (-2.1%)
Small Blend	0 (0.0%)	5 (5.3%)	-5 (-5.3%)
Small Growth	0 (0.0%)	6 (6.3%)	-6 (-6.3%)

The first bear market of the sample, the Dot-Com bubble, took place at the beginning of the sample period. During the 30-month crisis period the index nearly halved. Five years later started the most recent bear market, the global financial crisis, during which S&P 500 declined by 57%. Both bear markets lasted for over a year and the recoveries from these two market crises took over four years. While bear markets are relatively uncommon, market corrections are typical market behavior and thus much more common. The first market correction took place right after the Dot-Com bubble and the most recent one between September 2018 and December 2018, during which the correction was almost designated as a bear market. On average, market corrections are much briefer than bear markets and the recoveries are similarly fast.

Data on the excess market return, size, value and momentum factors is compiled from the Kenneth French Data Library to estimate the risk-adjusted returns for the two groups. The database was also used to acquire Treasury bill rates for monthly risk-free returns.

Table 3. S&P 500 performance during market crises

Beginning	End	Bear market / Correction	Performance, %	Length (months)	Recovery (months)
Mar 00	Oct 02	Bear market	-49.2 %	30	52
Nov 02	Mar 03	Correction	-14.7 %	3	2
Oct 07	Mar 09	Bear market	-56.8 %	17	48
Apr 10	Jul 10	Correction	-16.0 %	2	4
Apr 11	Oct 11	Correction	-19.4 %	5	5
May 15	Aug 15	Correction	-12.4 %	3	11
Nov 15	Feb 16	Correction	-13.3 %	3	4
Jan 18	Feb 18	Correction	-10.2 %	1	6
Sept 18	Dec 18	Correction	-19.8 %	3	4
		Average:			
		Bear market	-53.0 %	23.5	50
		Correction	-15.1 %	2.9	5.1
		Median:			
		Bear market	-53.0 %	23.5	50.0
		Correction	-14.7 %	3.0	4.0

4.2 Methodology

The empirical analysis of the mutual funds consists of a descriptive part and of single-factor and multi-factor asset pricing models. To conduct the analyses two time-series are formed from the mutual fund data. The first consists the time-series returns of an equally weighted portfolio of the SRI funds and the second is formed of the conventional funds. Using these portfolios, average and median monthly returns and standard deviations of these returns are calculated and compared to a US benchmark – S&P 500 index – using also local risk-free interest rates. The descriptive part also calculates these metrics during two subsamples, 2000 to 2009 and 2010 to October 2019, and during the two bear markets and recent corrections as well as during the recoveries of these bear markets.

Investment alternatives should be compared by using risk-adjusted returns. This analysis uses three traditional asset pricing models to estimate risk-adjusted returns for both mutual fund groups. After estimating the single-factor model further controls are

established by controlling for book-to-market, high-minus-low (HML), and size, small-minus-big (SMB), in addition to the market factor (MKT). The second multi-factor model controls for momentum (MOM) as well as HML and SMB.

4.2.1 CAPM

Capital asset pricing model, CAPM, is often employed in measuring the performance of mutual funds, responsible or otherwise. The model derives the expected return of a security. The single-factor model estimated here is of the following form:

$$R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it} \quad (3)$$

where R_{it} is the return on portfolio i in month t, R_{ft} is the one-month Treasury bill rate in month t, β_i is the slope coefficient of the regression for portfolio i and $R_{mt} - R_{ft}$ is the excess return on the market, value-weighted return of all CRSP firms incorporated in the US and listed on the NYSE, AMEX, or NASDAQ, and ε is the error term. The intercept term, α_i, of the model is often called Jensen's alpha (Jensen, 1968). This is an indicator to whether a portfolio has underperformed or outperformed its benchmark.

4.2.2 Fama-French 3-factor model

Fama and French (1993) present a three-factor model to extend the single-factor model. The model controls for the effect of investment style on fund performance. HML is the difference between the returns between value and growth stocks. Fama and French (1993) argue that high book-to-market (BM), outperform low book-to-market stocks. Thus, stocks with a higher exposure to the HML factor should have higher future returns.

The third factor in the model controls for the small firm effect. SMB mimics the risk factor in returns related to size. It is estimated similarly to HML, but instead of estimating the

difference between high BM and low BM stocks, the monthly difference in question is between small cap and large cap stocks. Again, higher exposure to the SMB factor should lead to higher expected returns. The three-factor model is estimated as follows:

$$R_{it} - R_{ft} = \alpha_i + \beta_1 (R_{mt} - R_{ft}) + \beta_2 \text{SMB} + \beta_3 \text{HML} + \varepsilon_{it}, \quad (4)$$

where β_1, β_2 and β_3 are slopes in the time-series regressions, $R_{mt} - R_{ft}$ is defined as above, *SMB* is the average return on the three small portfolios minus the average return on the three big portfolios,

SMB = 1/3 (Small Value + Small Neutral + Small Growth) – 1/3 (Big Value + Big Neutral + Big Growth),

and *HML* is the average return on the two value portfolios minus the average return on the two growth portfolios,

HML = 1/2 (Small Value + Big Value) – 1/2 (Small Growth + Big Growth).

4.2.3 Carhart 4-factor model

The third factor model is the Carhart four-factor model. Carhart (1997) extends the three-factor model with a momentum factor. Jegadeesh and Titman (1993) find that a strategy which buys recent winners and sells past losers generates significant positive returns over holding periods of three to 12 months. The model is estimated as follows:

$$R_{it} - R_{ft} = \alpha_i + \beta_1 (R_{mt} - R_{ft}) + \beta_2 \text{SMB} + \beta_3 \text{HML} + \beta_4 \text{MOM} + \varepsilon_{it}, \quad (5)$$

where β_1, β_2, β_3 and β_4 are slopes in the time-series regressions, the three factors are defined as above and *MOM* is the average on the two high prior return portfolios minus the average return on the two low prior return portfolios,

MOM = 1/2 (Small High + Big High) – 1/2 (Small Low + Big Low).

4.2.4 Factor models with crisis and non-crisis alphas

To estimate the performance of SRI and conventional funds during market crises, additional factor models are estimated. Following the framework demonstrated by Nofsinger and Varma (2014), the three aforementioned factor models are modified to include non-crisis (NC) and crisis (C) period alphas. The modified single-factor model is as follows:

$$R_{it} - R_{ft} = \alpha_{NC} D_{NC,t} + \alpha_C D_{C,t} + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it}, \quad (6)$$

where α_{NC} is the non-crisis period monthly alpha, α_C is the crisis period monthly alpha, $D_{NC,t}$ is a dummy variable that takes the value of 1 if time t is defined as non-crisis period and 0 otherwise, and similarly $D_{C,t}$ is a dummy variable that takes the value of 1 if time t is defined as crisis period and 0 otherwise. Crisis periods are the months during which S&P 500 is in a bear market or when a market correction takes place. These periods are presented in Table 3. Similar modifications are conducted for the multi-factor models. The modified Fama-French three-factor model is as follows:

$$R_{it} - R_{ft} = \alpha_{NC} D_{NC,t} + \alpha_C D_{C,t} + \beta_1 (R_{mt} - R_{ft}) + \beta_2 \text{SMB} + \beta_3 \text{HML} + \varepsilon_{it}, \quad (7)$$

where the variables are defined as above. The final model is the Carhart four-factor model with crisis and non-crisis alphas:

$$R_{it} - R_{ft} = \alpha_{NC} D_{NC,t} + \alpha_C D_{C,t} + \beta_1 (R_{mt} - R_{ft}) + \beta_2 \text{SMB} + \beta_3 \text{HML} + \beta_4 \text{MOM} + \varepsilon_{it}, \quad (8)$$

where the variables are defined as above.

5 Empirical analysis

This chapter investigates the performance of the two portfolios formed of the two groups of funds mentioned above. The performances of SRI and non-SRI are measured for the whole period, two sub-periods and during crisis, non-crisis and recovery periods. Particular attention is given to crisis periods by modifying traditional asset pricing models to include dummy variables to indicate crisis and non-crisis months. Lastly, this section investigates the performance of the SRI and non-SRI portfolios during the two recoveries following the Dot-Com bubble and the global financial crisis.

5.1 Descriptive statistics

This part of the empirical analysis measures the average monthly returns, the median monthly returns and the standard deviations of the monthly returns of the two portfolios, and compares these results to a benchmark portfolio, which in this case is the S&P 500 index, first for the whole sample period, then for two sub-periods and later for crisis, non-crisis and recovery periods.

5.1.1 Whole sample period and two sub-periods

As Figure 7 shows, the cumulative returns of both the SRI portfolio as well as of the non-SRI portfolio lag those of the benchmark during the whole period. Until the global financial crisis, the non-SRI portfolio fares better than the benchmark, but after 2014 the benchmark has outperformed even the non-SRI portfolio. The cumulative return of the SRI portfolio decreases significantly during the Dot-Com bubble and does not recover during the rest of the sample period.

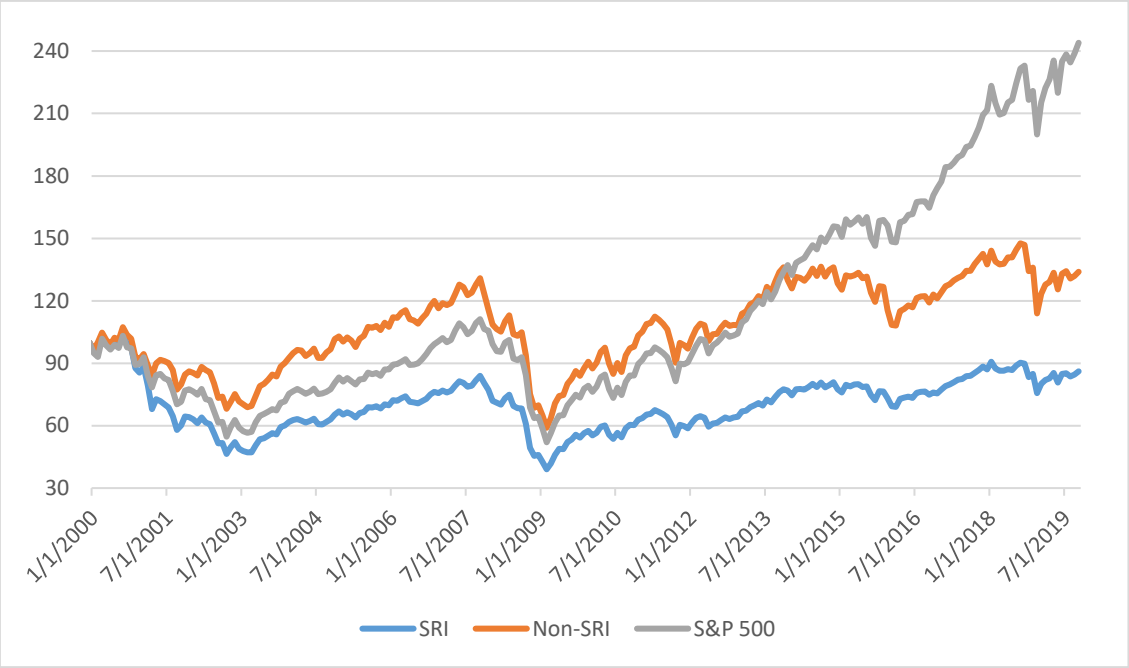

Figure 7. Cumulative returns of SRI and non-SRI portfolios (Jan 2000 - Oct 2019).

When comparing the cumulative returns during the first decade of the 2000s, as shown in Figure 8, the non-SRI portfolio decreases the least of the three portfolios during the Dot-Com bubble but has the largest drawdown during the global financial crisis. Still, the non-SRI portfolio has the largest cumulative return at the end of the first subsample. Again, the SRI portfolio fares the worst of the three portfolios. Due to the global financial crisis, none of the portfolios recover wholly from the Dot-Com bubble during the first decade of the 2000s.

Although the performance difference between the SRI and the non-SRI portfolios is large during the first subsample, the cumulative returns of the two portfolios are almost the same during the latter period – from 2010 to October 2019 –, as shown in Figure 9. The cumulative return of SRI is larger than that of the non-SRI portfolio, although the difference is insignificant. The most noteworthy part of the second subsample, is the outperformance of the benchmark index. The performances of the mutual funds have clearly lagged during the 2010s.

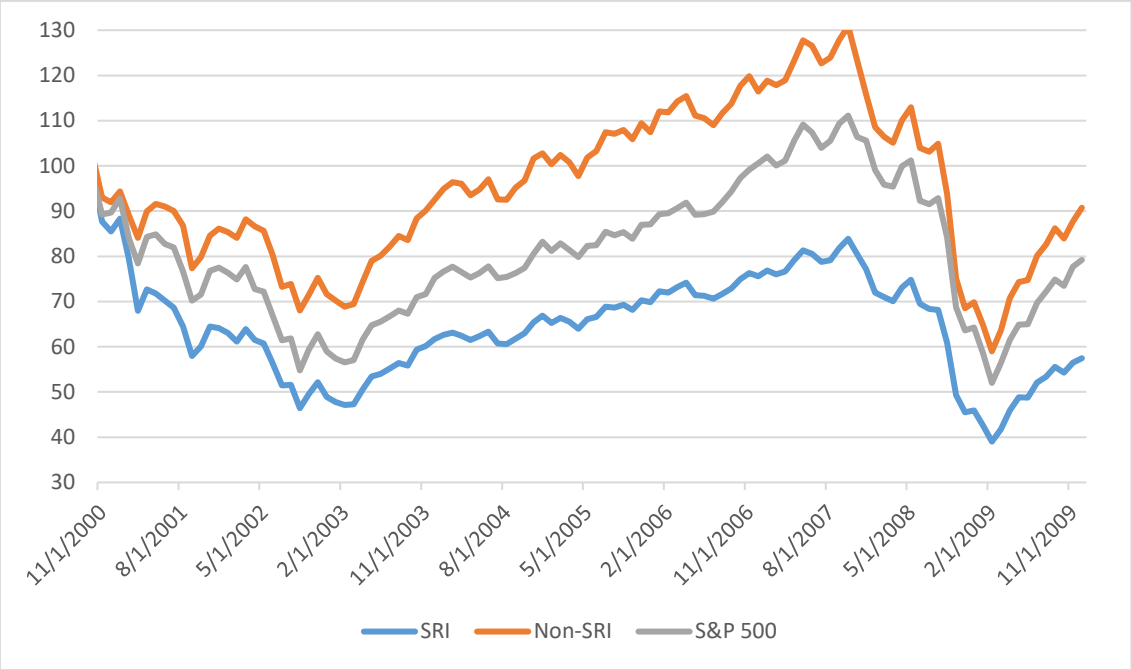

Figure 8. Cumulative returns of SRI and non-SRI portfolios (Jan 2000 - Dec 2009).

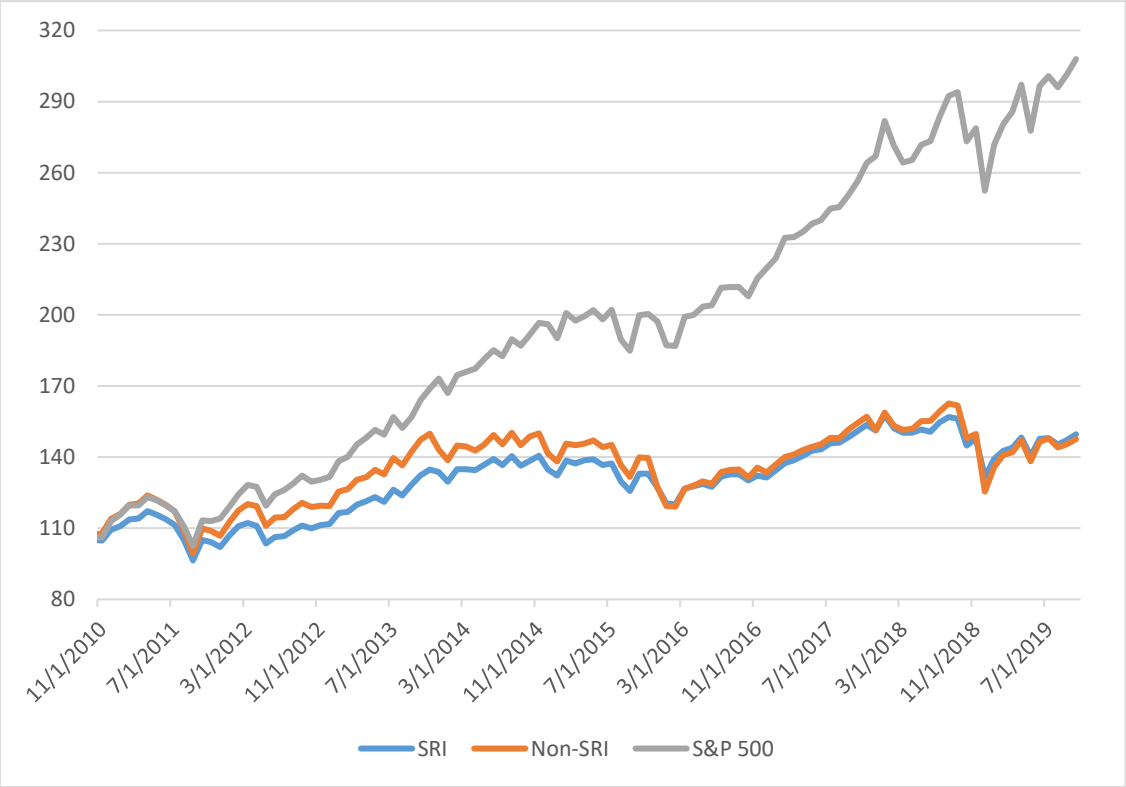

Figure 9. Cumulative returns of SRI and non-SRI portfolios (Jan 2010 - Oct 2019).

Monthly performance statistics are compiled in Table 4. The SRI portfolio fared the worst during the whole sample period. The portfolio underperformed both the non-SRI

portfolio and the benchmark index. Both differences are statistically significant when considering the whole sample period. During the first subsample, 2000 – 2009, the SRI portfolio underperforms significantly when compared to non-SRI, but the underperformance shrinks during the second subsample, 2010 – October 2019. During that period the difference between the average monthly returns is only -0.02% and the difference is not statistically significant.

Table 4. Monthly performance statistics

	Panel A: 2000 - 10/2019		
	Average monthly return	Median monthly return	St. dev. of monthly returns
SRI (1)	0.02	0.57	4.08
Non-SRI (2)	0.22	0.86	4.31
S&P500 (3)	0.47	1.07	4.23
(1) - (2)	-0.20***	-0.30	-0.23
	[-2.62]		
(1) - (3)	-0.44***	-0.5	-0.15
	[-5.83]		
(2) - (3)	-0.25***	-0.2	-0.08
	[-2.50]		
	Panel B: 2000 - 2009		
	Average monthly return	Median monthly return	St. dev. of monthly returns
SRI (1)	-0.35	0.08	4.71
Non-SRI (2)	0.03	0.86	4.57
S&P500 (3)	-0.08	0.74	4.71
(1) - (2)	-0.37***	-0.78	0.13
	[-3.27]		
(1) - (3)	-0.27**	-0.65	-0.01
	[-2.19]		
(2) - (3)	0.11	0.13	-0.14
	[0.76]		
	Panel C: 2010 - 10/2019		
	Average monthly return	Median monthly return	St. dev. of monthly returns
SRI (1)	0.40	0.83	3.28
Non-SRI (2)	0.41	0.87	4.02
S&P500 (3)	1.02	1.41	3.59
(1) - (2)	-0.02	-0.04	-0.74
	[-0.17]		
(1) - (3)	-0.63***	-0.58	-0.31
	[-7.04]		
(2) - (3)	-0.61***	-0.54	0.43
	[-4.57]		

Although the average returns of non-SRI were similar to those of the benchmark during the first subsample, the non-SRI portfolio underperforms during the second subperiod as seen in Table 4. The underperformance is statistically significant and almost as large as that of the SRI portfolio. Even though average returns of SRI lag its comparables and the benchmark, its standard deviation of monthly returns is lower than that of non-SRI during the whole sample period and 2010 – October 2019. During the first subsample the standard deviation of non-SRI is slightly lower than that of SRI. The standard deviations of all the portfolios are lower during the second subsample. This could be explained by the lack of bear markets in the 2010s. Although this period had its share of market corrections, it lacked the similar bear markets that faced the period of 2000 to 2009.

5.1.2 Bear markets, corrections and recoveries

Table 5 compares the monthly performance statistics during the two most recent bear markets as well as an aggregate of the most recent market corrections. The results are different when comparing the Dot-Com bubble to the global financial crisis. During the Dot-Com bubble the SRI portfolio's average monthly return lagged those of both non-SRI and the benchmark index. The differences are statistically significant, but the difference between the two mutual fund portfolios is significant at the critical level of 0.01, whereas the difference between SRI and the benchmark is only significant at the critical level of 0.10. During the global financial crisis, the average monthly losses are larger than during the Dot-Com bubble, but the differences between them are not statistically significant. During market corrections SRI outperforms non-SRI and the difference is significant at the critical level of 0.05.

During the Dot-Com bubble the maximum drawdown of the SRI portfolio was the largest but during the second bear market the maximum drawdowns were similar for all three portfolios. Although during the whole sample period the standard deviation of SRI was the lowest, during the Dot-Com bubble it was the largest. During the global financial crisis, the standard deviation of SRI was lower than that of both non-SRI the benchmark.

The standard deviations for the portfolios are lower during the market corrections and during these periods the SRI portfolio has the lowest risk.

Table 5. Monthly performance statistics for crisis periods

	Panel A: Dot-Com bubble			
	Average monthly return	Median monthly return	St. dev. of monthly returns	Max drawdown
SRI (1)	-2.48	-2.17	5.40	-55.29
Non-SRI (2)	-1.32	-1.14	4.54	-36.61
S&P500 (3)	-1.92	-1.52	4.96	-46.97
(1) - (2)	-1.15***	-1.03	0.86	-18.68
	[-3.31]			
(1) - (3)	-0.56*	-0.65	0.43	-8.32
	[-1.72]			
(2) - (3)	0.59**	0.38	-0.43	10.36
	[2.01]			
	Panel B: Global financial crisis			
	Average monthly return	Median monthly return	St. dev. of monthly returns	Max drawdown
SRI (1)	-3.82	-4.07	6.04	-53.47
Non-SRI (2)	-3.93	-5.81	6.56	-54.93
S&P500 (3)	-3.70	-3.30	6.40	-53.19
(1) - (2)	0.11	1.74	-0.52	1.46
	[0.42]			
(1) - (3)	-0.13	-0.77	-0.36	-0.28
	[-0.33]			
(2) - (3)	-0.23	-2.51	0.16	-1.74
	[-0.54]			
	Panel C: Recent market corrections			
	Average monthly return	Median monthly return	St. dev. of monthly returns	
SRI (1)	-3.52	-2.93	3.16	
Non-SRI (2)	-4.23	-2.96	4.12	
S&P500 (3)	-3.39	-2.61	3.20	
(1) - (2)	0.71**	0.03	-0.96	
	[2.19]			
(1) - (3)	-0.14	-0.32	-0.04	
	[-0.66]			
(2) - (3)	-0.85*	-0.34	0.92	
	[-1.84]			

Table 6 presents the performance statistics during the recovery periods following the two bear markets. During the recovery from the Dot-Com bubble (Panel A), the average monthly returns of the fund portfolios are similar, and the difference is not significant. The difference between the average returns of SRI and the benchmark is statistically significant at the critical level of 0.05 and in favor of the benchmark index. The low performance of SRI after the Dot-Com bubble explains why its cumulative return has not recovered during the rest of the sample period. After the global financial crisis (Panel B) the recovery returns are larger for the non-SRI portfolio and the benchmark, and the SRI performance is the lowest – the same as after the Dot-Com bubble. The differences in returns are statistically significant. As in the case of most of the other periods under investigation, the standard deviations of SRI were the lowest during both recoveries.

The descriptive statistics of the three portfolios suggests that the hypothesis concerning SRI outperformance during market crisis is in contradiction with the evidence. Especially during the Dot-Com bubble, the SRI portfolio performs extremely poorly compared to non-SRI and the benchmark index. The SRI portfolio's maximum drawdown is the largest and the average monthly return is the lowest. During the global financial crisis, SRI shows no signs of outperformance and similar results are found for other periods under investigation. The underperformance of SRI during the whole sample period does not support the hypothesis that the performance of responsible investing is similar to that of conventional investments. However, it is vital to investigate risk-adjusted returns as well to control for several risk factors before making conclusions about the performance of SRI.

Table 6. Monthly performance statistics for recovery periods

	Panel A: Recovery from Dot-Com bubble		
	Average monthly return	Median monthly return	St.dev. of monthly returns
SRI (1)	1.01	1.33	2.66
Non-SRI (2)	1.12	1.50	2.80
S&P500 (3)	1.24	1.35	2.74
(1) - (2)	-0.11	-0.18	-0.14
	[-1.10]		
(1) - (3)	-0.23**	-0.02	-0.08
	[-2.30]		
(2) - (3)	-0.13	0.16	0.06
	[-0.75]		
	Panel B: Recovery from global financial crisis		
	Average monthly return	Median monthly return	St.dev. of monthly returns
SRI (1)	1.13	1.26	3.98
Non-SRI (2)	1.40	2.13	4.48
S&P500 (3)	1.59	2.07	4.22
(1) - (2)	-0.28***	-0.87	-0.50
	[-2.54]		
(1) - (3)	-0.46***	-0.81	-0.24
	[-3.67]		
(2) - (3)	-0.18*	0.06	0.26
	[-1.54]		

5.2 Factor models

This section presents the results of the single and multi-factor models which were introduced above. The results are presented for the whole sample period as well as for two subsamples – from January 2000 to December 2009 and from January 2010 to October 2019. The results are also compared to those of earlier papers with similar models and samples.

5.2.1 Single-factor results

Panel A of Table 7 presents the risk-adjusted returns of the two mutual fund portfolios using a single-factor model, the CAPM. Panel B supplements the analysis with additional crisis and no-crisis period alphas. Standard errors for all t-statistics are Newey-West

adjusted (Newey & West, 1987). The regression results in Panel A suggest that both portfolios underperform drastically. The annualized alpha of SRI is -6.26% and the non-SRI alpha is -4.10%. Both alphas are highly significant. The difference is statistically significant at a critical level of 0.10. The results for responsible investing are of similar magnitude as those of Statman (2000). Although Renneboog et al. (2008) find negative alphas for SRI and conventional portfolios, the alphas are less negative at -2.84% and -1.52%, respectively. Their sample starts in January 1991 and ends in December 2003, which could explain the difference in the magnitudes. When considering the market factor loadings of the two portfolios, it shows that SRI performance is less driven by sensitivity to market returns (0.91) than that of non-SRI (0.95). Both betas are statistically significant, but the slight difference is not. Again, the results considering the market beta for SRI are similar to those of Statman (2000).

When introducing dummy variables to indicate crisis and non-crisis periods (Panel B), still, both portfolios exhibit negative alphas. The crisis period alpha of the SRI portfolio is -8.17% annually and statistically significant. Although the conventional portfolio's crisis alpha of -2.26% is not significant, the difference between the two groups is significant and highly in favor of the conventional portfolio – SRI underperforms by almost 6% during crises.

Table 7. SRI and non-SRI fund performance using a single-factor model

	Panel A: CAPM			Panel B: CAPM with crisis alphas		
	Alpha	MKT	Adj. R-squared	Crisis	No-Crisis	Adj. R-squared
SRI (1)	-6.26***	0.91***	0.94	-8.17***	-5.40***	0.94
	[-6.36]	[38.24]		[-3.94]	[-5.66]	
Non-SRI (2)	-4.10***	0.95***	0.91	-2.26	-4.91***	0.91
	[-3.48]	[28.97]		[-0.97]	[-3.30]	
(1) - (2)	-2.16*	-0.04	0.01	-5.92**	-0.49	0.04
	[-1.75]	[-0.97]		[-2.30]	[-0.49]	

During no-crisis periods the alpha of SRI is less negative (-5.40%) but still significant. Moreover, the non-SRI alpha (-4.91%) is now more negative and highly significant than during crises. The difference between the two portfolios is negative, but not significant. The crisis and no-crisis alphas are opposite to those of Nofsinger and Varma (2014). They

find that CAPM alpha of SRI is negative and significant during non-crisis periods while crisis alphas are positive and insignificant. The SRI – Non-SRI alpha is also positive and significant during crises and negative and positive during non-crisis periods. The sample of Nofsinger and Varma (2014) covers US equity funds during 2000 – 2011 so in order to get a more accurate comparison between these two studies, the alphas should be investigated during a more similar sample period, as done below using a subsample of 2000 to 2009.

5.2.2 Fama-French three-factor results

Using the Fama-French three-factor model and thus controlling for value and size factors in addition to the market factor, the results are similar to the single-factor model. In Panel A of Table 8 the annualized alphas for the two portfolios are again statistically significant and negative. The SRI portfolio alpha is -6.01% while the non-SRI alpha is roughly -4.51%. The difference is now lower at -1.50% and still significant at a critical level of 0.10. Renneboog et al. (2008) find similar results, but again, less negative. Also, they find that the difference between SRI and non-SRI alphas is not significant. Market sensitivities are high and statistically significant for both portfolios at 0.92 for SRI and 0.93 for non-SRI. Although this analysis does not suggest a significant difference, Renneboog et al. (2008) find that the difference is significant, and it suggests that SRI's market sensitivity is higher than that of non-SRI.

As Table 8 exhibits, neither portfolio is significantly exposed to small stocks, although the difference is highly significant and negative, suggesting that the SRI portfolio is less exposed to small capitalization. The results are similar concerning HML. Non-SRI returns are partially explained by its exposure to value stocks. The difference is again highly significant and negative. Thus, SRI is less invested in value stocks than conventional mutual funds. The results differ from those of Renneboog et al. (2008) in that they find that both SRI and non-SRI are tilted towards small, although the responsible portfolio is less so, and both favor value over growth. Again, it is noteworthy to state that although the

sample periods overlap, this thesis uses an extended one. Also, this study uses a different database to locate SRI and non-SRI mutual funds, which can explain the differences in the factor loadings. Still, the results concerning investment styles confirm the accuracy of the Morningstar style designations. Responsible funds are designated as favoring large cap stocks and employing more blend or growth strategies. Non-SRI funds have also exposure to small cap and more of these funds are invested in value stocks.

The risk-adjusted returns during crisis and non-crisis periods, as presented in Panel B of Table 8, show that after controlling for additional risk factors, the crisis alpha of the SRI portfolio is negative and significant at -7.51%. The alpha of non-SRI (-3.74%) is now significant at a critical level of 0.10 during crisis periods. Non-crisis alpha is -5.35% for SRI and -4.84% for non-SRI. They are almost the same as in the single-factor model. The difference is still insignificant, although negative. The results strengthen the doubt about the insurance-like properties of SRI. The results imply that responsible investing underperforms during crises, whereas during normal market conditions the difference is insignificant. Thus, the results suggest that the performance of SRI is the opposite of that suspected by the research hypotheses.

Table 8. SRI and non-SRI fund performance using the Fama-French three-factor model

	Panel A: FF3				
	Alpha	MKT	SMB	HML	Adj. R-squared
SRI (1)	-6.01***	0.92***	-0.03	-0.07*	0.94
	[-6.73]	[39.31]	[-1.40]	[-1.93]	
Non-SRI (2)	-4.51***	0.93***	0.12	0.08**	0.92
	[-4.21]	[33.19]	[-1.40]	[2.21]	
(1) - (2)	-1.50*	-0.01	-0.16***	-0.15***	0.27
	[-1.69]	[-0.36]	[-6.58]	[-3.39]	
	Panel B: FF3 with crisis alphas				
	Crisis	No-Crisis	Adj. R-squared		
SRI (1)	-7.51***	-5.35***	0.94		
	[-4.15]	[-5.47]			
Non-SRI (2)	-3.74*	-4.84***	0.94		
	[-1.67]	[-3.44]			
(1) - (2)	-3.77*	-0.51	0.28		
	[-1.93]	[-0.59]			

5.2.3 Carhart four-factor results

Table 9 represents the results for the Carhart four-factor model. When introducing the momentum factor (UMD) to the analysis, the alpha of SRI (-5.73%) is slightly less negative, although still statistically significant. The factor loading of UMD is negative and significant for SRI, whereas the addition of the fourth factor does not have a great impact on non-SRI, as now its alpha (-4.47%) is almost the same as in the case of the three factor-model and the sensitivity of the conventional portfolio to the momentum factor is not statistically significant. Now, the difference in the alphas is no longer significant. SRI is still highly affected by the market factor, but the effect is not as prominent as in the case of the three-factor model. The non-SRI portfolio's sensitivity to the market is like earlier. The sensitivities of the portfolios to the size factor are of the same scale, but in the case of the four-factor model, non-SRI exhibits a significant factor loading. Again, the difference is statistically significant.

The responsible portfolio is tilted more towards large capitalization and non-SRI is tilted towards small stocks. The magnitudes of the HML factor loadings are similar as in the case of the three-factor model, but now the sensitivity of SRI is significant at a critical level of 0.01. The difference is once again negative and statistically significant. The momentum factor loading of SRI is negative and highly significant, while that of non-SRI is almost zero and non-significant. The difference is negative and significant, suggesting that SRI is less tilted towards momentum stocks while non-SRI is neutral towards momentum.

The results for the models including the dummy variables, as represented in Panel B of Table 9, are similar to the results in the earlier models. During crisis periods the difference is yet again significant at a critical level of 0.10 and the difference in alphas during non-crisis periods shows no statistical significance. Similarly, Nofsinger and Varma (2014) find that additional risk factors do not change the results. The responsible portfolio shows no indications that it can outperform conventional funds during market turbulance, in contrast to the results of Nofsinger and Varma (2014). The differences in the

results could be explained by different samples of mutual funds and different sample periods – the effect of managerial skill cannot be discounted when measuring mutual fund performance. Although responsible investing does not underperform during no-crisis periods, investors should not expect abnormal returns while investing in responsible equity funds, since the results for the whole sample period suggest that SRI underperforms non-SRI and has a negative and significant alpha.

Table 9. SRI and non-SRI performance using the Carhart four-factor model

	Panel A: Carhart 4F					
	Alpha	MKT	SMB	HML	UMD	Adj. R-squared
SRI (1)	-5.73***	0.89***	-0.02	-0.08***	-0.05***	0.94
	[-6.27]	[38.12]	[-0.97]	[-2.80]	[-4.09]	
Non-SRI (2)	-4.47***	0.92***	0.12***	0.08**	-0.01	0.91
	[-4.10]	[30.60]	[4.03]	[2.08]	[-0.44]	
(1) - (2)	-1.26	-0.03	-0.14***	-0.16***	-0.04***	0.30
	[-1.46]	[-1.36]	[-5.87]	[-3.83]	[-2.69]	

	Panel B: Carhart 4F with crisis alphas		
	Crisis	No-Crisis	Adj. R-squared
SRI (1)	-7.68***	-4.86***	0.94
	[-3.83]	[-4.88]	
Non-SRI (2)	-3.77*	-4.77***	0.91
	[-1.67]	[-3.27]	
(1) - (2)	-3.92*	-0.09	0.31
	[-1.90]	[-0.11]	

5.2.4 Risk-adjusted returns of two subsamples

When comparing Panels A and C of Table 10, several changes can be noticed. First, the alphas of both portfolios have deteriorated from the first subsample to the next. In Panel A, the alpha of SRI is -4.43% whereas in the second subsample it is -6.57%. The drop is over two percentage points. However, the loss in performance is much worse for non-SRI. For January 2000 – December 2009 the alpha of non-SRI is -2.36% and significant only at a critical level of 0.10 while for the second subsample the alpha is -8.01% and highly significant. The difference in the first subsample is negative and significant at a critical level of 0.10 and in the second subsample it is positive, although insignificant.

The performance of the SRI portfolio has not increased but that of non-SRI has decreased significantly, which explains the difference.

Further analysis shows that the sensitivity to the market factor of the SRI portfolio decreases to 0.85 from 0.93 while that of non-SRI increases to 0.98 from 0.90. In the second subsample the difference is negative and significant. The systematic risk represented by the market sensitivity is lower for the responsible portfolio than for the non-SRI portfolio. The loadings of the size factor show no remarkable changes from the first subsample to the next. Although, the value tilt of non-SRI in the first subsample disappears in the second and actually turns towards growth stocks, though the factor loading is not significant in the second subsample. Thus, the significant difference in the first subsample fades in the second. Similarly, the difference in the factor loadings for momentum factor disappears in the second subsample, as non-SRI tilts towards weaker momentum.

Panels B and D of Table 10 show the crisis and no-crisis alphas for the two subsamples. During the first subsample, SRI has a lower annualized crisis alpha than in the second period, -7.88% and -6.68%, respectively. Moreover, the no-crisis alpha of the second subsample (-6.54%) is much lower than in the first (-2.10%). Similarly, the crisis alpha of non-SRI decreases from the first subsample (-3.71%) to the next (-7.63%). However, neither of them is significant. Likewise, the no-crisis alpha is much lower in the second subsample (-8.10%) than in the first one (-1.45%) and now the alpha of the second subsample is highly significant. The crisis performance of SRI increases slightly in the 2010s whereas the risk-adjusted return of its conventional peer is worse in the second period.

Table 10. SRI and non-SRI fund performance during two subsamples

	Panel A: Carhart 4F for the first subsample (2000 - 2009)					
	Alpha	MKT	SMB	HML	UMD	Adj. R-squared
SRI (1)	-4.43***	0.93***	-0.03	-0.08**	-0.04**	0.95
	[-3.77]	[27.26]	[-1.06]	[-2.15]	[-2.53]	
Non-SRI (2)	-2.36*	0.90***	0.13***	0.11***	-0.01	0.94
	[-1.96]	[21.92]	[4.31]	[3.39]	[-0.74]	
(1) - (2)	-2.07*	0.03	-0.15***	-0.19***	-0.03**	0.38
	[-1.87]	[1.21]	[-5.71]	[-4.42]	[-2.03]	

	Panel B: Carhart 4F with crisis alphas (2000 - 2009)		
	Crisis	No-Crisis	Adj. R-squared
SRI (1)	-7.88***	-2.10**	0.95
	[-3.37]	[-2.12]	
Non-SRI (2)	-3.71	-1.45	0.94
	[-1.57]	[-1.09]	
(1) - (2)	-4.17*	-0.65	0.38
	[-1.85]	[-0.69]	

	Panel C: Carhart 4F for the second subsample (2010 - October 2019)					
	Alpha	MKT	SMB	HML	UMD	Adj. R-squared
SRI (1)	-6.57***	0.85***	-0.02	-0.09**	-0.04	0.94
	[-6.03]	[40.10]	[-0.56]	[-2.02]	[-1.55]	
Non-SRI (2)	-8.01***	0.98***	0.13***	-0.08	-0.03	0.89
	[-4.80]	[22.90]	[3.18]	[-1.54]	[-1.22]	
(1) - (2)	1.43	-0.13***	-0.14***	-0.01	-0.01	0.46
	[1.51]	[-4.55]	[-7.23]	[-0.67]	[-0.57]	

	Panel D: Carhart 4F with crisis alphas (2010 - October 2019)		
	Crisis	No-Crisis	Adj. R-squared
SRI (1)	-6.68**	-6.54***	0.94
	[-2.54]	[-4.22]	
Non-SRI (2)	-7.63	-8.10***	0.89
	[-1.48]	[-3.22]	
(1) - (2)	0.95	1.55	0.44
	[0.30]	[1.19]	

The difference is no longer significant in the second subsample for the crisis alpha. The two portfolios perform more alike in the 2010s than in the earlier decade. However, the risk-adjusted returns for both portfolios during normal market conditions are much worse during the second subsample. The no-crisis alphas of the portfolios decrease by 4.44% and 6.65%, respectively, and both are now highly significant with non-SRI performing worse than the responsible portfolio. The difference is in favor of SRI, although it is insignificant. The sample period of Nofsinger and Varma (2014) overlaps this sub-

period. The results are still different and can be only explained by different samples of mutual funds, since the sample periods of these two studies are so close to each other.

During the first subsample the spread between crisis and no-crisis alphas of the portfolios is noticeable. SRI performs worse than non-SRI during crises but in normal market conditions the difference is no longer significant. During the 2010s the spreads between crisis and no-crisis alphas is almost non-existent and no longer does SRI underperform non-SRI during crisis periods. The risk-adjusted returns of the two portfolios are much more alike than at the beginning of the sample period. Still no evidence of SRI performing better than conventional mutual funds during market crisis is found.

6 Conclusions

This thesis examines the investment performance of responsible equity funds during January 2000 to October 2019 and compares it to results obtained from a sample of conventional equity funds. The empirical analysis starts with descriptive evidence on the performances of these two groups and continues with regression analyses to determine whether the differences are statistically significant after controlling for variables, which are often used in empirical research concerning investment returns.

The cumulative return of the SRI portfolio is smaller than those of the non-SRI portfolio and the S&P 500 index during the whole sample period. When analyzing the results during January 2000 to December 2009, the decade during which both the Dot-Com bubble and the global financial crisis occurred, both SRI and non-SRI underperform the benchmark index and again, SRI is the worst performer of the three. Although during the latter subperiod (January 2010 – October 2019) the benchmark has yet again the highest cumulative return, the returns of SRI and non-SRI are similar.

During the Dot-Com bubble the responsible portfolio is the worst performer and the difference between SRI and non-SRI is significant. Although the global financial crisis is much more severe a crisis, the difference between the mean returns during it is not significant. This is also noted in maximum drawdowns. During the Dot-Com bubble the maximum drawdown of SRI is the highest of the three portfolios but during the second bear market the drawdowns are much more similar. When comparing the results obtained during market corrections, it seems that SRI fares significantly better than non-SRI. However, when analyzing the performance after the Dot-Com bubble and the global financial crisis, it is obvious that both mutual fund portfolios lag the benchmark index. During both recoveries SRI lags both non-SRI and the benchmark, but the difference between SRI and non-SRI is significant only during the global financial crisis.

When estimating risk-adjusted returns during the whole sample period, the alphas of SRI range from -6.26% to -5.73%, depending on the chosen factor model. All three are

statistically highly significant. The results are similarly significant for non-SRI, ranging from -4.10% to -4.51%. The differences range from -2.16% to -1.26%. The results for the CAPM and the Fama-French three-factor model are weakly significant. To estimate whether SRI funds perform better than conventional funds during market crises, the three factor models are modified to include crisis and no-crisis alphas. The results are starkly in opposition of the first two research hypotheses of this study. The crisis period alphas of the differences are all negative and significant, although mostly at a critical level of 0.10. The no-crisis alphas of the differences are all statistically insignificant. This suggests that during crisis periods the SRI portfolio underperforms non-SRI but during normal market conditions there is no difference between the two portfolios on a risk-adjusted basis.

The performance of SRI is not indicative of outperformance during neither normal market conditions nor crisis periods. Additionally, no evidence of insurance-like properties of SRI mutual funds is found although the crisis period performance of SRI increases during the latter subperiod. Although, this could be explained by the fact that during the 2010s there has been no bear markets, only several market corrections. For responsible investors the results should not deter them from investing in responsible equity funds, because the returns of SRI are similar to those of non-SRI.

In the future, this topic could be studied by analyzing the performance of responsible companies during market crises instead of mutual funds. It should be noted that due to variety in responsible investing strategies and lack of standards, it is hard to designate responsible funds as responsible even though they market themselves as responsible investors. Recent developments in ESG data enables labeling companies as responsible easier than doing the same to mutual funds. Thus, it could be argued that future research in responsible investing should implement company data and employ material ESG factors. Furthermore, the performance of responsible investments during market crises could be analyzed using data from different countries. As developing markets are

increasingly attached to global capital markets, evidence of the performance of responsible companies in these countries is important to investors in these markets.

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